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8 May 1980

USSR Report

ENERGY

No. 9

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ESSR MINISTER OF ELECTRIFICATION ON GOSPLAN GOALS

Tallinn SOVETSKAYA ESTONIYA in Russian 12 Feb 80 p 2

[Article by E. Kraaving, head, Administration of Capital Construction and Electrification of the ESSR Ministry of Agriculture: "By the shores of the energy 'river'"]

[Text] The sudden increase in energy consumption in rural areas which is anticipated in our republic in coming years obliges us at this time to seriously consider means for future efficient utilization of the energy "river". The elevation of agriculture will be very dependent on the transition to the new level of energy supply.

Specific proposals on means of solving this problem—a problem of state importance— were stated in our newspaper on the public science advice page by Kh. Barabaner, candidate in ecoomic sciences ("Energy in agriculture", Sovetskaya Estoniya dated 31 Jul 79).

The vital positions advanced in the article are shared in principle by many agencies and experts. In particular, the same positions are held, as the editors explained, by the USSR Academy of Sciences' Division of Physical and Technical Problems of Energy.

After the article was published, the Ministry of Agriculture of the republic came to Gosplan ESSR with proposals. In the article presented below they are discussed by E. Kraaving, head of the Administration of Capital Construction and Electrification of the ministry.

There are two proposals for improvement of energy supply to the rural regions of the republic:

- to create a public energy committee in Gosplan ESSR which would coordinate solution of problems of energy supply including for rural regions;

- to create a special laboratory at the Institute of Thermophysics of the ESSR Academy of Sciences to study problems of rural energy supply which could develop outlooks for rural energy supply, investigate and solve current problems.

Let us explain the reasons behind these proposals.

It is commonly known that our republic has the most electrified agriculture in the country. The high level of energy consumption in kolkhozes and sovkhozes is also suggested by the fact that there are currently 2500 boiler units which consume 936,000 kilowatt hours (converted to electrical energy). If we add the 800,000 kilowatt-hours of electricity which are used for the needs of production in their "natural form", total consumption will come to almost 1,740,000,000 kilowatt-hours.

Rural energy consumption will increase even more in the future; labor requirements for electrical energy should be 1.6-1.8 times as great (and 1.8-2 times as great per rural inhabitant). In short, kolkhozes and sovkhozes of the republic on all accounts will consume 3 to 3.5 billion kilowatt-hours of electrical energy.

In truth there is a whole river of energy and it's time to see that it is used profitably and wisely and, based on national economic interests, in the most economic fashion. For this reason the need has come of age, we feel, for a committee to coordinate all these problems.

There is yet another side to our proposals for Gosplan. Agriculture in the republic is experiencing a shortage in manpower and there are only two ways to overcome this. The first is to reorganize the social composition of the village, i.e., to create conditions encouraging not only local youth to work here after graduation, but also attract urban youth. The second way is to have universal automation of the technological process. This alone can decisively improve the quality of agricultural products, increase quantities, reduce consumption of labor per unit production and decrease cost—in other words, only automation will improve all the economic indicators here.

At today's level of science and technology, however, this can only be done on the basis of electrified processes including production of heat. Here is a second range of problems requiring solution in the republic.

The Ministry of Agriculture of the Estonian republic holds the point of view (perhaps this is not entirely true) that under current conditions it is more profitable to use equipment producing heat and hot water on the basis of electricity instead of small and medium boiler units. Even a small boiler units operating on chemical fuel requires at least four firemen, which involves additional requirements for quarters, day care centers, mess halls and schools. A boiler operating on electricity, however, can be completely automated quite easily. Its capital investments are much less and the hazard of environmental pollution is also lower. This type of boiler unit does not need, like one which might operate on fuel oil, to import fuel from other regions of the country; for some parts of the republic that is difficult even with the current level of fuel consumption.

All-union methods now exist for determining which is more economical to use in a certain facility—chemical fuel or electricity. But it would seem that it is not always valid in our republic, since it does not take into account all the factors

arising from local conditions. We believe that the aforementioned methods must be refined in conformity with conditions in the republic and promising versions of energy supply for rural regions must be simultaneously developed-regional, rayon and county plans. There is no such plan now. One exception is the five-year plans drawn up by Estonenergo and Energoset'proyekt (The Ministry of Agriculture provides them with its own data on location of new industrial facilities and proposed electrical capacities). But these plans only concern development of electrical networks and can not consider the overall energy needs of rural regions. Based on this fact, we have also introduced a second proposal to Gosplan ESSR--on the creation of a special laboratory to study problems of energy supply of these regions.

We feel that the republic needs such a laboratory: it would unite the interests of various sectors and agencies into a scientifically-based approach to rural energy supply, develop directions as well as reliable and simple methods for analyzing energy sources at each individual facility.

The ESSR Ministry of Algriculture has reason to hope that this extremely important range of questions will be resolved. Our proposals have been discussed at the ESSR Gosplan college and they have assigned a committee which, by April of this year, should examine the question of rural energy supply of the republic and make suggestions for improving the situation to the leaderhship of Gosplan.

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METHODS FOR OBTAINING PEAK POWER FROM INDUSTRIAL TETS'S

Moscow ELEKTRICHESKIYE STANTSII in Russian No 2, Feb 80 pp 31-34

[Article by A.D. Machan, candidate of technical sciences, N.I. Shkoda, V.K. Balabanovich and V.A. Zolotareva, engineers, N.V. Mukovozchik, candidate of technical sciences, and V.A. Chizh, engineer, Belorussian Polytechnical Institute]

[Text] The work schedule of electric power stations in integrated power systems is determined by the irregularity of the daily load schedules. The use of TETs's to regulate load schedules is an urgent problem of modern thermal power engineering, since the percentage of district heating plants in the structure of the USSR YeES's [Unified Power System] generating capacities exceeds 28 percent of the electric power stations' total capacity [1], it also being the case that TETs's are located in areas that are peak load centers.

The obtaining of additional capacities at steam-turbine district heating plants is provided for by increasing the passage of steam through the entire flow-through section of a turbine or in separate parts of this section by turning off the feedwater high-pressure preheaters (PVD), reducing the heating capacity right down to complete disconnection of the production and heating takeoffs and transferring their load to the peak, reserve and other heat sources, redistributing the load of the controlled takeoffs, introducing additional steam from the low-pressure boiler units into separate parts of the turbine, and so on.

The basic methods for obtaining additional capacity at TETs's are limiting the load of the controlled takeoffs and disengaging the PVD's. Limiting the thermal capacity of heating takeoffs, the load of which can be made up by peak hot-water boilers (PVK) [2], offers great possibilities for obtaining additional capacity. Besides this, it is possible to achieve a

brief reduction in the heating takeoffs' load without transferring it to reserve sources by using the storage capacity of the buildings and heating networks.

As analysis has shown, of the possible methods for achieving a rapid pickup in capacity by reducing the load of the heating takeoffs, the one that is most convenient for practical realization is complete opening of the revolving diaphragms of the low-pressure component (ChND) and conversion of the turbine to free distribution of steam among the network preheaters and condenser. This provides a practically instantaneous increase in capacity on the order of 10-18 percent of the turbine's rated output (the higher figure applies to type T turbines with maximum pressure in the heating takeoff in the initial mode).

Using a combined theoretical and experimental method, we checked the technical possibility of this method for obtaining peak power at the Minsk TETs-3. In connection with this, the mechanical and vibrational reliability of the turbine units during rapid (for several seconds) opening of the revolving diaphragms was confirmed.

In all possible modes, the change in the ChND's stages' temperatures does not exceed 10-70°C, while the allowable temperature difference is 80°C; the ChND's relative expansion for some increase (0.2-0.5 mm) did not, on the whole, exceed 0.6-0.7 mm, which is considerably less than the allowable expansion. In all modes the turbines' vibrations did not exceed 20-25 μm, while the axial displacement did not change for all practical purposes.

With respect to the bending stress conditions in the guide and moving blades, as calculations have shown, there is no overload of the stages except for the pretakeoff 21st stage of the T-100-130 turbine, which restricts the possibility of completely opening the ChND's revolving diaphragm for a network return water temperature $t_{nr} < 55°C$. The same limitation occurs for a PT-60-130/13 turbine with respect to the overload conditions for the stage preceding the heating takeoff under rated takeoff load conditions when $t_{nr} < 57°C$ and network water consumption G_{nw} = 1,100 t/h, as well as for $t_{nr} < 50°C$ and G_{nw} = 800 t/h.

For very rapid (over the course of several seconds) opening of the ChND's revolving diaphragm, which is necessary in emergency situations, it is also possible to stall the network preheaters' condensate-removal pumps because of partial boiling-up of the condensate when the pressure in the takeoff drops. However, this is a short-lived process and normal operation of the

network preheating unit is easily restored by turning on the reserve pump.

The theoretical and experimental data on the increase in turbine output agree satisfactorily (the discrepancy between them falls within 5-10 percent limits). This indicates that the calculative technique used is a reliable one.

In this case, additional capacity is provided with unchanged heat consumption in the turbine because of the decrease in the thermal load. Therefore, considering the replacement of this load by the reserve sources, the specific heat consumption in order to obtain the additional capacity is

$$q_{add} = \frac{\Delta Q_t}{N_{add}}, \quad (1)$$

where ΔQ_t = reduction in the turbine's thermal load; N_{add} = increase in the turbine's output.

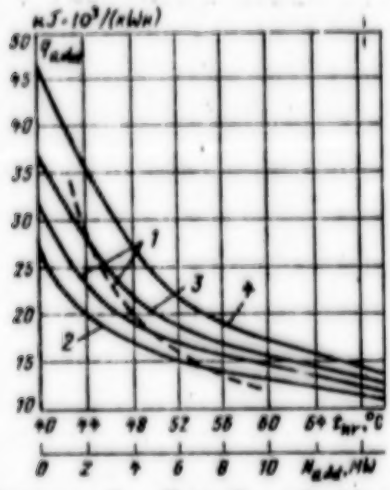

Figure 1. Graph of the dependence of the specific heat consumption in order to obtain peak power on the network return water's temperature (solid lines) and additional capacity (broken line) in connection with the transition to free steam distribution for a PT-60-130/13 turbine: 1-4 = network water flow rates of 1,300, 1,000, 1,600 and 2,000 m^3/h, respectively.

As calculations have shown, the value of q_{add} depends primarily on the temperature of the network return water or the pressure in the heating takeoff, and is also determined by the network water flow rate or the turbine's initial thermal load. As the network return water's temperature drops the value of q_{add} increases, since in connection with this the steam pressure in front of the ChND and the degree of economy of the condensation generation of electricity both decrease. As the heating takeoffs' initial thermal load changes, the value of q_{add} changes insignificantly. As an example, in Figure 1 we show the relationships of the change in q_{add} for a PT-60-130/13 turbine for different network water flow rates.

As is obvious, for the rated initial thermal load on the heating takeoff for the PT-60-130-13 turbine, the numerical values of q_{add} fall in the

interval 11,900-34,000 kJ/(kWh). It should be mentioned that in this case the additional capacity is obtained because of a reduction in the thermal load while the network water flow rate remains unchanged. In connection with this, there is a simultaneous reduction in the pressure in the heating takeoff and an increase in capacity is achieved not only in the ChND, but also in the turbine's medium-pressure component (ChSD). If the thermal load were to be changed by reducing the network water flow rate while keeping its preheating constant, then -- as calculations show -- the degree of economy of the additional electricity's generation would be lower [3], since in connection with it there would be a smaller increase in the ChSD's capacity.

When there is redundancy in the reduction of the turbine's thermal load because of the presence of PVK's, the calculated expenses for the additional generation of electricity are, in rubles per kilowatt-hour,

$$\varepsilon_{ca} = \frac{q^{ca}_{add} \cdot 10^{-3}}{\eta_{bu} \eta_{tf} \cdot 29309} Ts_t + p_n \frac{K^{PVK}_{sp} q^{ca}_{add}}{h} \cdot 10^{-3}, \qquad (2)$$

where h = number of hours of utilization of the peak capacity per year when the outside air temperature is below 0°C.

The specific calculated heat flow rate is

$$q^{ca}_{add} = \frac{\sum_{i=1}^{n} q_i \tau_i}{\sum_{i=1}^{n} \tau_i},$$

where τ_i = number of hours in the i-th interval of outside air temperatures below 0°C per year [4]; q_i = average specific heat flow rate in order to obtain additional capacity for the i-th temperature interval.

On the basis of data in [5], the relationship $E_{ca} = f(h)$ is shown in Figure 2 for q^{ca}_{add} = 21,950 kJ/(kWh), closing expenses for gas and oil fuel Ts_t = 23 rubles/t, boiler unit and thermal flow efficiency η_{bu} = 0.9 and η_{tf} = 0.98, p_n = 0.18, and specific cost of the additionally installed PVK's K^{PVK}_{sp} = 2,300 rubles/GJ (10,000 rubles/Gcal). Here, also, we see the relationship for the case of covering the peak capacities with the help of gas turbine power plants (GTU) for an average operational specific conventional fuel consumption rate of 0.485 kg/kWh and specific capital expenses for the GT-100-750-2 on the order of 80 rubles/kW [5].

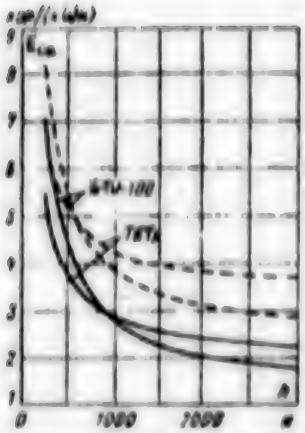

Figure 2. Graph of the dependence of calculated expenses for covering the peak electrical loads with the help of GTU's and TETs's with PT-60-130/13 turbines on the number of hours of utilization of peak capacity per year for outside air temperatures below 0°C: solid and broken lines = = conventional fuel costs of 23 rubles/t for a TETs and 27 rubles/t for a GTU, and 40 rubles/t for a TETs and 50 rubles/t for a GTU, respectively.

As is obvious, in the case where h is less than 850 and 550 h (for conventional fuel expenses of 40-50 rubles/t), covering the peak capacity by limiting the load of the turbines' heating takeoffs and transferring it to additionally installed PVK's is more advantageous than the installation of GTU's. It is necessary to take this into consideration when developing integrated power systems.

Calculations that were made for the district heating plant turbines in the Belorussian power system show that the method under discussion -- limiting the load of the heating takeoffs of PT-60-130/13 turbines -- can, on the whole, provide the Belorussian SSR with a peak capacity on the order of 100 MW, which -- in comparison with the installation of GT-100-750-2 GTU's -- will provided a savings in calculated expenses of about 200,000-250,000 rubles.

In view of the possibility of obtaining peak capacity by this method quite rapidly, it can be regarded as a revolving reserve for a power system and used to regulate the frequency in a power deficit period or in a period of an emergency boiler capacity deficit. In connection with this the automatic control systems (SAR) for tur ines should be reorganized so that can work out a signal according to the frequency in the network and automatically open the revolving diaphragms.

As has already been stated, another well known method for obtaining peak capacity is disconnection of the PVD's, which is normally used to increase the condensation generation of electricity. In connection with this there is an increase in heat losses during the cycle (in the condenser), with it obviously being the case that the additional generating power will be provided by the specific heat flow rate, as determined from an expression, the numerator of which is the change in the turbine's capacity and the increase in heat losses in the condenser when the PVD's are disconnected:

$$q_{add} = \frac{3600\Delta N_i + (\Sigma D_{PVD} - \Delta D_{PND})(i_k - i'_k)}{\Delta N_i \eta_m \eta_g}, \quad (3)$$

where ΔN_i = increase in a turbine's internal capacity; ΣD_{PVD} = sum of the steam consumption in the PVD's in the initial mode; ΣD_{PND} = increase in steam consumption in the low-pressure preheater (PND) when the PVD's are disconnected; i_k, i'_k = enthalpies of the spent steam and the condensate in the condenser, respectively.

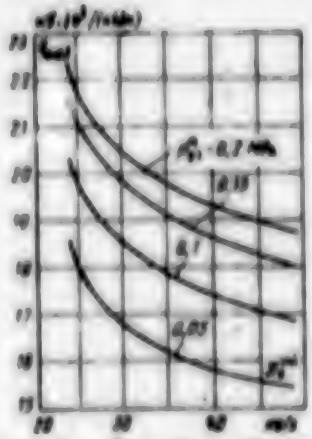

Figure 3. Graph of the dependence of the specific fuel consumption rate for the additional generation of electricity when a T-100-130 turbine's PVD is disengaged on the ChND's initial steam load and the pressure in the lower heating takeoff.

The changes in the value of q_{add} when the PVD of a T-100-130 turbine is disengaged are shown in Figure 3. In connection with this, the increase in the turbine's capacity was found with due consideration for the changes in the pressure and steam flow rate in the PND, the vacuum in the condenser and the operating mode of the turbine's ChND.

As is obvious, the value of q_{add} changes from 15,500 to 22,200 kJ/kWh and depends heavily on the turbine's initial operating mode. For high pressures in the heating takeoff and low steam consumption rates in the condenser in the initial mode, the degree of savings of the additional generation of electricity is reduced substantially. This is explained by the reduction of the increase in capacity in the turbines' ChSD's and th ChND's low efficiency. The same type of change in q_{add} is also inherent in other district heating plant turbines.

On the whole, the degree of savings in the additional generation of electricity when the PVD's are disengaged at a TETs is substantially (40 percent or more) lower than when they are disengaged from condensation power generation units, particularly when the latter operate at supercritical pressures. Therefore, the disconnection of the PVD's at a TETs in or er to increase the condensation capacity is unjustified, in any case, if the possibilities of overcharging the condensation units by disconnecting their PVD's are not used. This is also substantiated by the fact that, as a rule, TETs steam boilers cannot provide their rated steam productivity when the feed water's

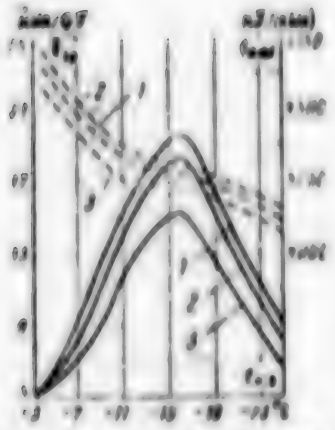

Figure 4. Graph of the dependence of additional generation of electricity e_{sp} per 1 GJ of a turbine's heating takeoff's load (solid lines) and specific fuel consumption rate q_{add} per 1 kWh of additional generating power (broken lines) on the temperature of the outer air: 1. T-50-90 turbine; 2. T-100-130 turbine; 3. PT-60-130/13 turbine.

temperature is reduced according to the conditions for reliable operation of the boilers' radiation surfaces.

At the same time, at TETs's having a reserve of steam productivity in their boiler rooms, disengagement of the PVD's can be used in order to improve the economy of TETs operation when the outside air temperatures are low (during the period of PVK operation). We have demonstrated the effectiveness of disengaging turbine PVD's during this period for the purpose of increasing the heating takeoffs' loads (beginning with the preheating of the network water for maximum pressure in the takeoff) and achieving the appropriate displacement of the PVK's load.

Calculations have been made for all the turbines used in Belorussian SSR TETS's for temperature schedules of 150/70 and 150/80°C and district heating system coefficients α_{TETs} = 0.5 and 0.6. In connection with this, the increase in the network preheaters' thermal heads as their thermal load increases was taken into consideration, along with the change in the recovery system's operating mode. For the example in Figure 4 we have presented the results of calculations for a 150/70°C temperature schedule at α_{TETs} = 0.5. The results of the calculations for PT-50-130/7 and PT-135/165-130/15 turbines, which are not shown in Figure 4, correspond approximately to the data for the T-100-130 turbine.

As is obvious, in such a mode it is possible to provide an increase in a turbine's capacity for generating electricity for district heating purposes on the order of 15-19 kWh/GJ (approximately 8-10 percent) in comparison with the amount generated on the basis of the heating takeoff in the initial mode. The maximum additional electricity generated for thermal use corresponds to the outer air temperature at which the greatest additional water preheating is achieved (for maximum pressure in the takeoff) and, accordingly, so does the maximum additional heat output. The increase in the specific heat consumption

rate for additional generating capacity from 3,600 kJ/kWh is explained by the fact that the negative effect from increasing the pressure in the heating takeoff in comparison with the initial mode applies to the additional generation of electricity.

The implementation of this method for improving the economy of TETs turbines insures a savings of 1.3 kg of conventional fuel per 1 GJ of initial heating load. This savings can be determined from the expression

$$\Delta B = \bar{e}_{sp} (q_{ext} - q_{ext}) \frac{1}{\eta_{tr} \eta_{b} 29\,309}, \qquad (4)$$

where $\bar{e}_{sp}$ = specific generation of electricity for heating use.

The disengagement of PVD's for this purpose will naturally be advisable when it is impossible to achieve such an increase in the heating takeoffs' load by the supplying of additional steam to the turbine; that is, if the turbines operate in the initial mode with a maximum rate of steam flow through their high-pressure components (ChVD).

An increase in the capacity and economy of turbine district heating power plants of the PT type can be insured by redistributing the load of the production and heating takeoffs. When part of the production takeoff's load is transferred to the ROU [possibly pressure-reducing and cooling unit] and there is a corresponding increase in the heating takeoffs' load during the period of operation of the PVK's, it is possible to increase -- as calculations have shown -- the turbine's capacity by 2-5 percent in comparison with the initial capacity obtained during the heating takeoff of the steam. In connection with this, additional generating power will be insured with a specific heat flow rate of about 3,690 kJ/kWh. The technical and mode limitations during the realization of this method of TETs turbine operation will be the same as those already mentioned.

It is necessary to mention here that at a TETs where peak network water preheaters have been installed, it is first of all necessary to use the possibility of increasing the production takeoffs' load with the feeding of steam into the peak preheaters. This will provide a greater increase in the generation of electricity for district heating purposes that when the heating takeoffs are overloaded, since no increase in pressure in the heating takeoff is required. The flexibility of a TETs with peak network preheaters can also be increased by taking the load off the turbines during low points in the load curve and transferring the heating load to the peak preheaters through the ROU.

CONCLUSIONS

1. Of the possible methods for a rapid pickup in capacity through a reduction in the heating takeoffs' load, the most convenient one for practical realization is the complete opening of the ChND's revolving diaphragms. In connection with this, additional capacity on the order of 10-18 percent of a turbine's rated output is obtained almost instantaneously.

2. Peak capacity coverage by limiting the load of the turbines' heating takeoffs and transferring it to additionally installed PVK's is more advantageous than the use of GTU's when the number of hours of utilization is less than 850 during the period when the outside air temperature is less than 0°C.

3. Disengagement of the PVD's of district heating plant turbines in order to obtain additional capacity can be used to improve the economy of TETs operation when the outside air temperature is low (during the period of PVK operation) by increasing the heating takeoffs' load and correspondingly displacing the PVK's load.

4. By transferring part of the load of the production takeoff of a type PT turbine to the ROU and correspondingly increasing the load of the heating takeoffs during the period of PVK operation, it is possible to increase a turbine's output for heating purposes by 2-5 percent of the original output, with a simultaneous improvement in the economy of turbine power plant operation because of displacement of the PVK's load.

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REVIEW OF IRIKLINSKAYA GRES OPERATIONS

Moscow ELEKTRICHESKIYE STANTSII in Russian No 2, Feb 80 pp 2-6

[Article by I. G. Kashtanov, manager of the Orenburgenergo REU, and Ye. V. Chernyshev, director of the Iriklinskaya GRES: "Iriklinskaya GRES--Enterprise of Communist Labor"]

[Excerpts] The Iriklinskaya GRES is located in the western part of Orenburgskaya Oblast on the left bank of the Iriklinskiy reservoir built on the Ural River.

The electric power station began operating in November, 1970 with two power units working simultaneously. The GRES contains eight power units with a power of 300 MW, PK-41-1, TGMP-114, and TGMP-314 boilers, K-300-240 turbines from the Leningrad Metal Plant, and TVV-320-2 generators from the Elektrosila Electrical Machine Tool Association in Leningrad. The capacity of the power plant is 2400 MW. Electrical power of 110, 220, and 500 kV is distributed to the Ural's combined power system.

From 1971 to 1979 the specific consumption of conventional fuel was reduced by 31.2 g/(kWh) and amounted to 319 g/(kWh) in 1979, while the total savings of conventional fuel reached 400 thousand tons.

The dynamic behavior of the technical and economic indicators of the operation of the Iriklinskaya GRES is shown in the table.

In close cooperation with the All-Union Thermal Engineering Institute, the Central-Asiatic Affiliate of the All-Union Institute of Gas Utilization Moscow Power Engineering Institute, Ural Branch of the All-Union Research Planning and Institute of Heat Engineering Structures, and Uraltekhenergo, a number of measures were undertaken at the power plant in order to improve the reliability and versatility of the power plants, and to improve their operating efficiency.

The vulnerability of the NRCh screens to high-temperature corrosion has been significantly reduced by means of regular yearly chemical scrubbings and running water vapor along the walls. To ensure regular combustion of fuels oils with sulfur in the furnaces of supercritical-pressure boilers with stoichiometric excesses of air in all the areas subject to loads, a preliminary high-temperature heating of the fuel oil to 250° occurs in order to reduce the ash build-up on the convective heating surfaces, to lower the rate of high-temperature RVP corrosion, and to raise the technical and economic indicators of the power plant operation. The introduction of a thermal wave method of

cleaning the RVP packing allows the RVP resistance and the temperature of the exhaust gases to be maintained at acceptable levels. An aluminum silicate additive Kremalit-1 is mixed in the fuel oil to reduce the solicity of the ash deposits on the heating surfaces of the boilers and to lower the emission of nitrogen oxides.

The heating surfaces of the boilers are kept clean by a pneumatic sand blaster. The convective high-pressure vapor superheaters of the PK-41 boilers have a steam bypass in order to equalize the hydraulic characteristics along with a simultaneous reduction of the temperature conditions in the pipes by 20°C.

The operational reliability and the versatility of the electric power unit were improved by using an automatic emergency relief system for the units (ASARB) with boilers operating on gas and fuel oil.

At the present time, specialists from the planning department of Soyuzenergoavtomatika are helping to modernize the emergency automatic control system for the GRES by incorporating an automatic three-speed system for changing the thermal load (80 kW/sec, 160 kW/sec, 3300 kW/sec) of the boilers without disconnecting the turbogenerators of the power unit from the network.

The main efforts of the collective of the electric power station are directed toward achieving high technical and economic indicators by effective utilization of the present equipment, and by increasing the operational level, the quality of the maintainence, and the working conditions and production standards. A set of measures to improve the operational economy of the equipment have been undertaken along with the All-Union Institute of Heat Engineering imeni F. E. Dzerzhinsky, the SAP of All-Union Institute of Gas Utilization, the Ural Branch of the Dzerzhinsky Institute, the Soyuztekhenergo, the Podolskiy Machinery Plant imeni Ordzhonikidze, the Leningrad Metal Plant, and other organizations.

Index	1971 г.	1972 г.	1973 г.	1974 г.	1975 г.	1976 г.	1977 г.	1978 г.	1979 г.
Electric power output, MkW/hr	3492	5287	8061	8473	11,728	11,320	12,986	12,290	15,890
Ratio of use of established power capacity, %	58.9	57.2	61.6	63.4	74.4	71.6	82.4	76.9	85.0
Operational readin ss, %	77.0	83.3	95.8	87.3	86.1	81.6	91.0	87.7	91.7
Specific fuel consumption for distributed electrical power, g/(kW-hr)	350.3	340.4	336.6	332.6	327.9	325.5	321.4	320.5	319.0
Consumption of electrical power for own needs, %	4.18	3.74	3.97	3.57	3.37	3.39	3.15	3.06	3.03
Production cost of distributed electrical power, Kop/(kWh)	8.51	8.05	7.98	8.05	7.59	7.32	6.47	6.60	6.40
Labor productivity (calculated per worker), thousand Rubles	41.0	50.7	70.8	72.8	104.2	103.3	120.4	114.5	148.5

Thus, the intensification of the fuel combustion process with low air excesses is achieved by placing blunt bodies in the boiler furnaces, yielding a savings of 104 tons. and rubles per year. The introduction of a system for minimum throttling of the supply water to the boiler feed regulators allowed the consumption of heat for driving the supply turbopumps to be reduced. Stabilization of the fuel oil temperature (145-150°C) in the fuel pump ensured the operation of the automatic regulators for the condensed water temperature (80-90°C) after the water left the preheaters. This reduced the steam used to prepare the fuel and increased the operational reliability.

Efforts were made to improve the systems and production equipment: the basic condensate systems were reconstructed in order to lower the hydraulic drag, the ejector pumps of the Leningrad Metal Factory (LMZ) were replaced by improved designs from the Dzerzhinsky Institute of Heat Engineering (VTI), the BOU cellulose filters were replaced by sulfer graphite filters, the use of the steam heat accumulated in the boilers to develop electrical power during planned shut-downs of the energy plants, the introduction of RVP graphite seals to lower the air suction and electrical power used for thrust and blowing, etc.

Much attention has been given to raising the operational reliability of electrical components. Efforts have been made, in conjunction with Uraltekhenergo, to improve the reliability of pressure switches with 110, 220, and 500 kV, to modernize their pneumatic systems to avert premature disconnections, to increase the switching capacity, and to improve the organization of repid repair work. A compressor that operates at 230 kgs/cm^2 instead of the present 40 kgs/cm^2 has been assembled in order to completely exclude the possibility of a drop in the air moisture in the switching chamber. The flexible outlets to the devices in the center of the station have been strengthened through the efforts of the Ural Branch of UralTEP [All-Union Planning Institute for Heat Engineering Structures].

At the GRES great importance is given to the utilization of the experiences of kindred electric power stations, visits back and forth to exchange information are frequent, and scientific and technical data are given practical application.

The power station pays special attention to the preservation of the environment and constantly tries to improve the treatment of industrial and everyday sewage flowing into settling ponds, and the water is subsequently used in the irrigated farms of a cooperative sovkhoz. The complex of treatment facilities was exhibited at VDNKh USSR and was highly rated.

At the present time, in cooperation with MEI [Moscow Power Engineering Institute] and UralTEP, a closed system is being developed for regenerating the water used in the chemical treatment. The Orenburg Medical Institute is conducting research into the effect of heated water on the flora and fauna of the Iriklinskaya reservoir.

The Iriklinskaya GRES has given a lot of attention to the improvement of the organization and technical equipment of the repair service. As an attempt at improving the efficiency of the equipment operation, the repair personnel issue a certificate for major overhauls of the equipment. The certificate makes each member of the brigade morally responsible for the work. In all, 300 certificates have been issued.

The GRES has the potential for improving the technical and economic indicators by raising the operational efficiency of the power units, increasing the efficiency level of the equipment, further improving in the organization and quality of the repair work, strengthening the role of moral and material incentives, and constantly improving the type of socialistic competition and adaptation of technical measures.

They are planning to modernize the low-pressure flow-through section of the turbines, to install modernized end seals on the rotors of the high-pressure cylinders, to install low-pressure heaters of the mixed type, and to replace the high- and low-pressure KPP of the second stage of the PK-41 boilers by installing on ovefhead cooling system.

In focusing attention on improved production efficiency, the Iriklinskaya GRES considers their basic tasks to be the work with cadres, the devleopment of socialist competition on a broad basis, progress towards a communist relationship with work, and the successful completion of their tasks and socialist responsibilities.

In 1975, the Iriklinskaya GRES took part in the competition for the right to develop electrical power in the trillion kilowatt-hour range, and the results of the competition showed that shift No. 4 (head of the shift is E. A. Nikonorov, the party group organizer is N. N. Verbin, and the trade union group organizer is I. V. Romasenko) was among the winners. Today, the fuel saved amounts to more than 30 million kWh of electrical power.

9370
CSO: 1822

PLANTS INVOLVED IN AES CONSTRUCTION NAMED

Yerevan KOMMUNIST in Russian 29 Feb 80 p 1

[Article by N. Avetisyan, party committee secretary, Armyansk AES]

[Text] In response to the summons of the CPSU Central Committee on the commencement of socialist competition in a "working relay race" for timely and early incorporation of major industrial capacities and facilities, the teams of builders, assemblers and operators took on the obligation to complete construction of the first phase of the Armyansk AES ahead of schedule. We called upon suppliers of basic equipment, designs and construction materials to support our obligation.

Enterprises of the Russian Federation supplied the main equipment, housing and upper reactor unit for construction of the Armyansk AEs. The Ukraine and Uzbekistan supplied metal and pipe, monitoring/measuring devices and automation equipment. Belorussia supplied complex distributing devices. Azerbaijan supplied transformers, Estonia supplied tanks, filters and safety valves, Kazakhstan supplied pumps, Latvia supplied communications equipment, Moldavia supplied rectifiers and stabilizers, Georgia supplied metal roll.

Many workers and technical engineers of the Armyansk atomic power plant underwent OJT and studied the advanced experience at the Novo-Voronezhsk and Kol'sk AES. In turn, experts of these plants participated in the assembly and adjustment of the second unit.

In a multinational team of builders and assemblers, the crews of Viktor Markushev from Gidroelektromontazh; Albert Sarkisyan from Gidrosantekhmontazh; Sadraldin Balinov from Sumgaitsk; Yakov Gavrilov from Krasnodarsk; Karlo Khenidze from Tbilissk assembly sections of Kavkazenergomontazh; Nikolay Shishkanov from the Kol'sk section of Sevzapenergomontazh, Slavik Khudayan from Kavkazenergomontazhizolyatsiya, Ambartsum Manukyan and Yakov Manukyan from AES construction management were outstanding and became winners of the socialist competition.

We were inspired to this innovative, responsive approach by the words of comrade L. I. Brezhnev, general secretary of the CPSU Central Committee, chairman of the Presidium of the USSR Supreme Soviet who, after starting up

the first unit of the Armyansk AES, expressed his firm confidence that our engineers would do everything possible to quickly assimilate the planned technical and economic indicators, successfully complete construction of the first phase of the electrical power plant and bring to life party plans on further increase in the country's energy potential.

We can now report that we have kept our obligation. The Armyansk AES has been put into complete planned capacity. It has already generated over 5,000,000,000 kilowatt-hours of electricity. In response to a new greeting from comrade L. I. Brezhnev, the crew of the AES assures that it will now on be carrying on intensive work and will serve as an example in the struggle for future enhancement of efficiency and quality of work.

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MAINTENANCE OF TES, AES ELECTRIC MOTORS

Moscow ELEKTRICHESKIYE STANTSII in Russian No 2, Feb 80 pp 11-13

[Article by R. I. Sokolov, engineer at the Lvov Affiliate of the Central Design Bureau of Glavenergoremont]

[Text] The total capacity of electric power plants increases every year due to the start-up of new plants and the expansion of existing ones. The increase in power is largely due to the introduction of large-scale power units.

An increase in the unit power of machines in TES and AES plants has led to an increase in power of the auxiliary equipment, and this in turn has affected the size and mass of electric motors. Electric motors with a power of 5-8 MW and weighing up to 25-30 tons are being operated in modern TES and AES.

The increase in the size and mass of electric motors was not adequately reflected in the plans for modern TES and AES. Obviously, this is the result of the complicated attitude of planning institutes toward electric motors from the start of planning for TES when they try to respond to different pressures, when electric motors of relatively small power and mass are used as the electric drive of auxiliary equipment and the planning institutes attempt to reduce the specific capital costs per unit rated power. In the plans for large-scale TES and AES, over-all solutions were not obtained for the problems dealing with the organization of motor repairs. There were not even special repair areas, let alone workshops with the necessary equipment and accessories for repairing electric motors. The arrangement of the auxiliary equipment often did not allow stationary hoisting machines to have access to certain high-voltage electric motors (and to low-voltage motors weighing up to one ton), which means that a large amount of hand labor is expended on disassembling them and delivering them to the repair area.

The lack of TES and AES workshops with suitable area, height, and hoisting capacity to repair large electric motors compels repair personnel to build repair areas near the installed units. The electric motors of exhaust fans and air blowers at a TES are often repaired under the open sky, which

affects the quality of the repair work, the service life of the insulation and the length of the time between repairs. When the repair area is located in a machine room, the electric motors are not subjected to the atmosphere, but, just as in the motors in the boiler section, a bridge crane cannot be used for disassembly and re-assembly because it is busy working on the basic units. All sorts of devices are used for disassembling and assembling electric motors in machine halls and boiler sections, and their installation means an additional expenditure of labor.

With regard to the total labor intensiveness, the electric motors at TES and AES comprise the greater part of the electrical equipment, whose maintenance occupies the major portion of the maintenance personnel.

For example, at a 12x200 MW TES the maintenance of the generators takes 22 persons, the transformers require 17 persons, and the electric motors 66 persons; the accounting costs of its own needs, the cable costs and electric lighting require 44 persons. The large number of maintenance personnel (in the TES electrical shop and the power repair enterprise) needed for the maintenance of electric motors is due to the absence of workshops with the equipment and accessories for repairs, insufficient means of disassembling and transporting electric motors to the repair area, and unsuccessful arrangement of the equipment, and the low reliability of the electric motors. The latter is the reason that the labor costs for rebuilt electric motors are more than 70 percent of the total labor costs of the repair service. The labor costs are also increased because of the lack of suitable conditions for rebuilding work in the electric station. This is especially true in regard to the AES, since it is not advisable to take electric motors from the strict-control area to some repair facility.

The average service life of the electric motor insulation is considerably shorter than that indicated by those who drafted the TU-16 technical specifications. For mica tape insulation it is 5-8 years, though planned for 10-15 years.

For example, the Burshtynskaya GRES rebuilt the stator windings of more than 20 engines every year from 1975-1978, including 10-12 units that had completely new windings.

The amount and types of products offered by the electrical engineering industry as replacement winding coils for high-voltage electric motors do not completely satisfy the requirements of the electric power stations and repair organizations. For this reason the coils destined to replace those out of commission are manufactured by the electric power stations and repair organizations themselves in workshops without the required tools, and this has a negative effect on their quality. The electric motors whose stator windings are manufactured in this way have a service life of just a few years. The cost of replacing the stator windings of high-voltage electric motors is comparable to their total cost. It then follows that the lack of well-equipped workshops for repairing electric motors causes a real financial loss to the electric power stations.

The Lvov Affiliate of the Central Design Bureau of the Main Administration for Repair of Electric Power Plant Equipment (Glavenergoremont) has investigated the reliability of high-voltage electric motors of unit-type TES [Ref. 1]. Some types of research on the TES electric motors are also used for AES.

Research results show a discrepancy between operational and planned reliability. The parameter of the breakdown rate is 0.13-0.38 1/yr, while the probability of breakdown-free operation after 2 years of operation equals 0.67 on the average, whereas the manufacturer's instructions give this figure as not less than 0.9.

The reasons for this confidence level of failureless operation are the structural discrepancy regarding the operational conditions for the types of electric motors installed in electric power stations (frequent starts at TES due to control by the load curve) and the insufficient quality of the repairs. The latter factor is caused by the lack of normal conditions for motor repair both at TES and at AES. However, the lack of special workshops for motor repair is more evident at AES, since most of the electric motors at AES with RBMK-1000 reactors are in the strict control area.

Thus, the failure of one of the VDA-173/99-6 electric motors driving the main circulation pump (GTsN) at an AES with RBMK-1000 reactor that occurred in 1979 was the fault of the repair personnel. The disassembly and assembly of these motors (the electric motor with a flywheel weighs 33 tons) took place directly adjacent to the place they were installed, and the length of the stay of people in this facility is determined by dosimetric protocol. For this reason not enough attention was paid to the secure attachment of a part during the motor assembly, and during the operation of the motor the part fell on the stator winding and caused a failure which made it necessary to repair the electric motor (six coils of the stator winding were replaced).

Without a doubt, the assembly and control operations for electric motors could be satisfied in a facility where the length of stay of the personnel is not determined by the dosimetric protocol, and thus the negative results could be avoided.

Even for small high-voltage electric motors installed in a strict-control area, the repair work involves high costs because of the lack of workshops or even specially equipped areas in which time is not restricted by the dosimetric protocol.

Thus, to repair A-113-4M motors (which drive the pump for the control and safety rods) the dosimetric protocol is formulated so that the repair personnel can stay from 1 hr and 45 min up to 2 hr and 30 min. The personnel who have left the strict-control area after having received the allowed dose occupy themselves with casual work in a clean zone for the rest of the day.

Repair organizations at AES calculate the amount of work done at electric power stations according to price list NO. 26-06-19, "Wholesale Prices for Repair of Basic Power Equipment at Atomic Power Stations Performed by Organizations of the USSR Ministry of Power (Minenergo) [Issue 14]." Although the quoted prices in this list are somewhat higher than in the wholesale list used for TES work, the repair organizations are now experiencing difficulties because of the high labor costs associated with the maintenance of electric motors due to the high production costs of repair work (which are higher than the list costs).

In the strict-control zones for AES there is a lack of facilities for electric-motor repair and areas set aside for this purpose which have hoisting equipment and which have devices for separating electric power machines. This is also applicable to motors in machine shops; although they are within the range of cranes, separate places are not always set aside for their repair (except for the motors of electrical pneumatic [PEN] and other pumps, whose stators are not disconnected from the seat during repairs), and therefore the organization of the repair yards involves additional labor costs for each repair.

The need to improve the conditions for maintenance of electric motors by building repair shops in clean zones and strict-control zones at AES is obvious.

The technical and economic advantages of centralized repair of electrical equipment in general and electric motors in particular is justified in [Ref. 2].

The advantage of building workshops for performing typical repairs at the TES [Ref. 3] is confirmed by the requests for documents received at the Lvov Affiliate of the Central Design Bureau (TsKB) of the Main Administration for Repair of Electric Power Plant Equipment [Glavenergoremont] from TES and repair organizations after information was published on the development of workshop technology for the repair of electric motors and starting devices (the total area is roughly 1500 m^2) that was performed on the orders of GRES with power units of 200 and 300 MW.

The rebuilding of electric motors (a complete replacement of the stator windings) can be organized either by large-scale GRES's and AES's or by a special facility (in the case of AES's, only for motors in the clean area).

Some work in this direction has already been done by planning organizations. Thus, the Ural Branch of the All-Union Institute for Planning of Electrical Equipment [Teploenergoproekt] provided for a workshop to repair electric motors weighing up to 25 tons, when they drafted a unified OVK for GRES's with power units of 800 MW. However, motor repair workshops have not been planned for GRES's with different power units.

It is advantageous for any kind of standard repair work requiring the electric motor to be disconnected from the unit and the seating to be performed in a workshop. Certain types of electric motors having structural features which prevent them from being moved on ordinary conveyers (DAZO with gauge 19, ADT-4000, AV-8000, etc.) can be moved on a special trailer with 25-tons capacity that was developed by the Lvov Affiliate of the TsKB of Glavenergoremont. The Workshop should be equipped with hoisting machines capable of unloading the motors.

To perform any kind of repair work (minor maintenance, standard overhaul, or rebuilding) by factory methods providing high labor productivity and high-quality work, the workshop should be equipped with power machine separators and have the following available: a room for pneumatic and hydraulic cleaning of electric motors; a device for washing parts; a painting room; a drying room; bays for dismantling electric motors with a vertical load; stator trimmers; supports for installing and turning rotors; a machine tool for making grooved wedges; a machine tool for balancing rotors; a bench for rolling electric motors; drilling presses and energy wheels; a complete set of strippers (hydraulic and screw); a complete set of accessories for extracting sections of stator windings from electric motors; shelves for storing units and parts when working on electric motors; and joiner's benches for repairing the units and parts of electric motors.

In addition to the above equipment, the following are needed for rebuilding electric motors: a chamber for annealing poured windings; winding machine tools; a soaking bath and a device for inserting roller bearings.

Making back-up coils for stator windings of high-voltage electric motors with mica tape insulation should be done at large-scale facilities with compounding equipment to ensure their high quality.

The usable steel from electric motors should also be processed at large-scale facilities.

Building workshops equipped with the above equipment for repairing electric motors at TES and AES will lower the specific labor costs [Ref. 4] for repairs, improve the labor productivity of the maintenance personnel, and help increase the time between repairs and the readiness factor.

CONCLUSIONS

1. The absence of the facilities and equipment needed for the repair of electric motors in the plans for TES and AES increases the maintenance costs and the time needed to eliminate breakdowns and defects that can cause electrical power shortfalls.

2. An improvement in the electric motor maintenance (a reduction of the specific repair costs and an increase in the quality of the repairs, and thus in the probability of failureless operation) can be achieved by

organizing the repair work in the workshops on a factory (high-productivity) basis in the TES and AES.

3. In replanning TES and AES such workshops should be included in the drafts, and even for strict-control zones in the case of AES's.

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9370
CSO: 1822

TESTING THE GTA-18 GAS TURBINE UNIT

Kiev ENERGETIKA I ELEKTRIFIKATSIYA in Russian No 1, Jan-Mar 80 pp 22-24

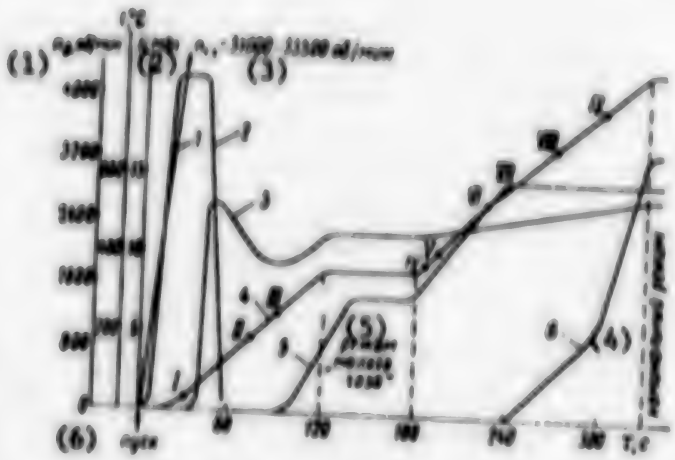
[Article by G. V. Zhgulev, engineer at the Kharkovskaya Central Heat and Power Plant No 3]

[Text] The adjustment, testing and operation of the GTA-18 gas turbine power unit were carried out successively using aviation kerosene, diesel fuel and natural gas. The Kharkov Turbogenerator Plant, the All-Union Power Engineering Trust [Soyuztekhenergo], the All-Union Institute of Heat Engineering imeni F. E. Dzerzhinsky [VTI], the Polzunov Institute for Planning and Design of Gas Turbines [TsKTI], the Trust for Mobile Electric Power Stations, and other organizations took part in the adjustment and research efforts.

During the first runs the systems for remote control and automatic starting of the engine were adjusted, as was the automatic control of the GTA-18 as a whole. The automatic engine starting was stabilized up to the "low-gas" mode (1750-1850 rpm), the unit was run up to the dry-run mode, a procedure was developed for the starting operation, etc. The engine was easily started by the turbostarter and responded well. At 1300-1350 rpm the turbostarter switched off, and at 1400-1500 rpm the power turbine and the electric generator started up. The changes in the characteristic quantities during the engine ignition are shown in the figure below.

Tests of the device in the ignition, loading, stopping, and alternating modes indicated that the GTA-18 has a high switching capacity. Under remote and automatic control the unit started easily on liquid fuel and was loaded in 6 minutes from the moment the signal was fed to the ignition until complete loading.

Investigation of the temperature conditions in the power turbine indicated that the air-cooling system for the nozzle vanes functioned normally. The temperature of the turbine metal was stable, and the temperature gradients stayed at acceptable levels in the most important parts of the stator. The results obtained allowed us to start the unit from a cold state in less than 6 minutes.



Ignition of the GTA-18

Key: 1 - angular velocity of the turbostarter; 2 - temperature of the working gases for the turbostarter; 3 - temperature of the working gases for the engine; 4 - angular frequency of the engine; 5 - angular frequency of the free power turbine and the electric generator; 6 - electrical power of the GTA-18; I - switching on the starting fuel pump and the engine ignition; II - switching off the starting pump of the engine; III - switching off the self-starting system of the engine; IV, V - closing and opening the valves of the turbostarter; VI - starting the regulator for the turbine automatic control system; VII - connecting the electric generator to the network; VIII - onset of automatic operation of the pump-regulator of the engine; IX - closing the air bypass belt of the engine compressor.

Key: 1 - n_{eng}, rpm
2 - N, MW
3 - n_{t-s}=31, 000-33,500 rpm
4 - nominal load
5 - low-gas load
6 - ignition

Tests of the unit operating on diesel fuel (without any design changes or modifications in the engine) indicated that all of its parts and systems operated satisfactorily. Practically the same basic parameters were obtained with kerosene operation. In all, 72 starts were made with kerosene and 14 with diesel fuel.

The engine was switched from liquid to gaseous operation by replacing the liquid-fuel nozzles with gas burners.

The most difficult stage of the tune-up and testing of the GTA-18 was the final adjustment when switching the engine to natural gas ignition. It was necessary to adjust to gas ignition only by replacing the nozzles with gas burners, and not by any design changes in the aircraft-type liquid-fuel combustion chamber of the engine.

The problem was further complicated by the absence of data from factory bench tests of physically worn out, power boilers as water heaters (for utilization of the heat of the GTA-18 exhaust gases), which can produce a large economic dividend.

A very promising approach is to use the GTA-18 in a gas-vapor cycle along with a 300 MW power unit. The exhaust gases of the two GTA-18's heat the feed water flowing to the boiler unit. The regenerative high-pressure superheaters are not connected to the K-300-240 turbine.

This feature provides additional peak power of 62 MW without a reduction in the economic operation of the power unit. In the unloading phase the GTA-18 units are converted to the synchronous compensator modes.

The gas turbine superstructure in this case can operate both according to the gas-vapor cycle and autonomously, which improves the switching properties of the power unit.

Thus, the first stage in the adjustment and testing of the experimental industrial gas turbine GTA-18 has been completed successfully. The research conducted on it and the test operations have confirmed the correctness of the draft calculations and the basic design solutions for the unit as a whole.

The positive results obtained from the adjustment, testing, and trial operations of the GTA-18 on liquid and gaseous fuels provide a realistic basis for the design and large-scale production of units of this type. It is also necessary to build units with a higher unit power on the basis of new types of aviation engines.

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BRIEFS

RECONSTRUCTION OF EQUIPMENT--The Tsimlyanskaya GES, which began operating in 1952, has obtained a 10% increase in the power of the second unit--a "veteran" of the domestic hydroelectric power system. The collectives of the Spetsgidroenergomontazh [Specialized Hydro-electric Assembly] and Rostovenergoremont [Rostov Energy Equipment Repair] Trusts reconstructed a generator and some other parts of the unit. The same operation was used for the other machines, and the station was able to generate considerably more power. [Text] [Moscow STROITEL'NAYA GAZETA in Russian 17 Feb 80 p 3] 9370

BENEFITS OF AUTOMATION--The Nurenskaya GES has been able to begin operating automatic equipment for group control of the live power of hydroelectric units--the GRAM system. It is used for feeding power to the LEP-500 electric power transmission lines. GRAM is a component part of a large group of automatic devices installed at the Nurenskaya GES. Many of its features are still unique and have been applied first in Tadzhikstan, which has become a testing ground for Soviet hydroelectric power. The introduction of GRAM has raised to a higher qualitative level the work of the operators of the Nurenskaya GES and the operational control service of the Dushanbe-Vakhshskiy electrical power system. The automated equipment is used for the systematic control of the output power and improves the stability of the parallel operation of the Dushanbe-Vakhshinskiy electrical power system with the combined power system of the Central Asia and South Kazakhstan. GRAM allows Nurenskaya GES to give an additional 10 thousand KWh of cheap electricity daily to its neighboring system. [Text] [Dushanbe KOMMUNIST TADZHIKSTANA in Russian 16 Jun 79 p 1] 9370

RAPID ASSEMBLY--The manufacture of roofing panels made of profiled steel sheet provided with polystyrene foam insulation has been set up at the Kiev Plant of Experimental Designs of the Spetsatomenergomontazh association. Their use will speed up assembly and eliminate additional finishing work at the construction site. Since the start of the year, ten thousand square meters of corrugated roofing have been delivered to the Chernobyl'sk, Rovensk and Zaporozhsk atomic power plants. [Text] [Kiev PRAVDA UKRAINY in Russian 24 Feb 80 p 1] 8617

COMPLETION OF RIGA TETS-2--The last piece of work at Riga TETs-2 -- the fourth boiler unit, which has a rated steam output of 480 tons per hour -- has been released to Latvglavenergo's operators by the general contractor, the Daugavagesstroy administration. Specialists from the subcontracting trusts Severzapenergomontazh, Belenergomontazhizolyatsiya and Gidroelektromontazh worked together harmoniously on this construction project. The new thermal electric power station has made it possible to eliminate the electricity deficit in Riga, improve the heat supply, and close more than 20 unprofitable boiler rooms. [Text] [Moscow STROITEL'NAYA GAZETA in Russian 17 Feb 80 p 3]

KOLYMA GES TRANSFORMER--The auto train hauling the giant 250-ton transformer from Magadan sea port to the site of the Kolyma GES has already covered 387 kilometers. More than 60 detours and bridge crossings had to be constructed to handle this unusual cargo over rivers and swamps. Another 20 detours and bridges remain to be built and several bends in the road must be widened to accommodate the 50-meter-long load. Drivers of the auto train have pledged to deliver the transformer by 1 April. [Magadan Domestic Service in Russian 0755 GMT 18 Mar 80 OW]

CSO: 1822

ENERGY CONSERVATION

SAVING FUEL-ENERGY RESOURCES URGED

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 2, Feb 80 p 23

[Article: "Saving Fuel-Energy Resources Should Be the Concern of Everyone"]

[Text] The uninterrupted supply of high-quality fuel to the national economy should be achieved not only through an increase in the extraction of gas, but also through its more effective and economical utilization.

This fact is well understood by workers of the "Turkmentransgaz" Production Association, including workers of Gas Compressor Station Number 3 (GKS-3) of the Komsomol'skiy LPUMG [not further identified]. The GKS-3 worker collective initiated a wide-scale competition aimed at the rational utilization of raw materials, materials and fuel-energy resources and adopted additional higher obligations for the fourth year of the 5-year plan--a 4 percent decrease in the expenditure of gas for their own needs, thereby saving 12 million cubic meters of natural gas.

The appeal made by the work collective of GKS-3 to all gas compressor station workers under the USSR Ministry of the Gas Industry was published in GAZOVAYA PROMYSHLENNOST' No 9, 1979, calling upon them to support this initiative.

The fourth year of the current 5-year plan has been completed and our editors turned to Chief Yu. L. Godlevskiy of Gas Compressor Station Number 3 with a request to tell us how the adopted obligations were fulfilled and what was done towards achieving the goals which were set.

To fulfill the obligations which were adopted, the workers of GKS-3 were required to work out and introduce new measures for ensuring the rational utilization of gas.

A continuous control system was instituted over the expnditure of gas. Measurement units were installed in strict accordance with regulations; control and registration instruments were checked carefully; and additional

measurement units were installed on every gas-pumping unit in order to make it possible to determine the expenditure of gas for each unit separately, as well as making it possible to compare the units' work. Introduction of devices with standardized signals permitted the automatic feeding of gas-expenditure data into a computer and the analysis of the technical condition of the gas-pumping unit (GPA). Unproductive losses at valves used on units at the compressor station were excluded. There was also a decrease in gas loss when dustcatchers were "blown" clean.

LPU rationalizers are making an important contribution to saving fuel-energy resources. Stepping up their activity did much to promote competition for better innovative suggestions directed towards saving as, lubricants and materials, eleven proposals were submitted during that competition, which, when introduced had considerable effect.

The LPU collective, as a result of the great deal of work which it did towards improving the reliability of the gas-pumping unit and auxiliary equipment, was able to increase its control over the unit's calorific performance. Elimination of the loss of combustion products and of air from the gas-pumping unit facilitiated an increase in the efficiency of the turbo-units; by dint of use of heat in constant reserve, a boiler rooms site was brought in an doet up within the working area; utilization of the heat of exhaust gases to warm hothouses belonging to the LPU provided the opportunity last year to place over 600 quintals of vegetables upon the tables of gas-industry workers.

Measures were constantly applied which facilitated the saving of energy resources.

Energetic participation in the struggle for economizing and for being cautious in the expenditure of raw materials and energy resources has become the business of every worker in our collective; thanks to this fact, GKS-3 was able to achieve high production indices over the period which has elapsed.

Right now, our collective, inspired by the CPSU Central Committee decree "On the 110th Anniversary of the Birth of Vladimir Il'ich Lenin," is striving with honor to fulfill our tasks and socialist obligations for the year in order to celebrate that significant date properly.

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MEASURES EXPLAINED FOR SAVING GAS IN BAKU

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 2, Feb 80 pp 22-23

[Article by A. I. Akhmedov and L. Kh. Mukhsinova of the Cybernetics Institute of the Academy of Sciences of the Azerbaijan SSR and the Azerbaijan Institute of Petroleum and Chemistry imeni M. Azizbekov: "Potentials for Gas Savings in Baku"]

[Text] The rational utilization of gas along with its forced extraction will include creation of even more favorable conditions and premises for satisfying the need for it in social production and by the populace. In connection with this, the question of uncovering potentials for decreasing gas consumption acquires particular importance.

The rational utlization of gas is one of the chief factors facilitating the regular supply of gas to Azerbaijan. Of tremendous significance in this is the high technical level of the republic's gas industry although even that high level evokes a certain concern.

Analysis discloses that almost one half of the gas pipelines which we have in operating require major repairs and the timely replacement of equipment. Work in this direction is already being conducted; this has had a positive effect upon the utilization of gas. It is important, however, to facilitate not only the normal functioning of gas industry technical systems but to regulate correctly the distribution of gas among consumers, while making specific changes in standards for its expenditure and rate limits.

Existing "Fundamental Regulations for Standardizing the Expenditure of Fuel, Electrical and Heat Energy in Production" already are out of date. New standards are needed which take into consideration the fundamental regulations contained in the decree of the CPSU Central Committee and the USSR Council of Ministers entitled "On Improving Planning and Intensifying the Influence of Economic Mechanisms Aimed at Improving the Effectiveness of Production and work Quality." One of our basic tasks is

ensuring the rational and effective utilization of gas. A certain amount of work in this direction has already been accomplished within the republic. As a result of this work, 123 out of 256 enterprises in the city of Baku were observing gas utilization standards in the first quarter of 1979.

The overwhelming majority of Baku enterprises are large gas consumers. Of those enterprises, 75 have a quarterly limit of 1 million cubic meters or more; in the first half of 1979, these enterprises received over 70 percent of the city's industrial gas supply. Only 32 enterprises did not exceed their limit. The Imeni 26 Baku Commissars and the Baku Dairy Combine both used up more than double the NGDU [Administration of Oil and Gas Extraction] limit, while the motor vehicle spare parts plant and the Leninskiy Industrial Combine consumed three times the limit. Enterprises of the petroleum extraction industry are using up their gas in a non-rhythmic fashion. Almost the same picture can be observed at all of the enterprises of the Azerbaijan Breadbaking Industry Association under the republic Ministry of the Food Industry.

Correct standardization plays an important role in the matter of gas economy. In this connection also, notice must be taken of the imperfections in the so-called report-statistical method of standardization; instead of using precise technical data as a basis, the method uses the figures of the year before. It is upon them that gas expenditure norms are set.

Reports, controls and limits placed upon gas consumption are necessary to place the situation in good order. Absolutely indispensible is the need to set a limit upon the allocation of gas to the Mashtaginskiy Construction-Materials Combine, the Central Station for the Technical Servicing of Passenger Vehicles, the "Giprometneft" Institute, the asphalt plant in the city of Lokbatan and others which, judging by reports they submitted for the first quater of 1978, did not use a single cubic meter of gas.

Adherence to established standards can be achieved not through short range campaigns, but by systematically carrying out the proper organizational-technical measures. In a selective inspection, however, the Azerbaijan Territorial Inspectorate of the State Committee for Supervision of the Gas Industry discovered that 36 of the city's enterprises had not worked out any measures for economizing gas; that 28 enterprises did not have technically-substantiated, specific standards for gas expenditure per individual unit produced; that there was no report and control system over the expenditure of gas at 50 enterprises; that boiler unit switch adjustment work was not being conducted at 115 enterprises; and that 108 enterprises were doing no gas system adjustment work at all. The boilers at a number of enterprises still had antiquated, uneconomical burners with nonfunctioning water aeration devices.

Particular note must be made of the fact that heat-bearing gases were not and are not now being utilized to provide heat for housing as well as for commercial and communal-municipal services buildings.

Off-shore fields are the main producers of gas for the enterprises of Baku. Normal supply of gas to consumers is entirely dependent upon their work. However, in winter time, in gas pipelines which have been laid down in the sea, ferric oxides often form within the pipe and these cause an interruption in the regularity of the gas supply. On days when there is a sharp fall in temperature, days on which the city's need for gas increases, a shortage of gas results. During those same periods of low temperature there is a decrease in the extraction of gas; this further impedes the organized delivery of gas to consumers and increases the probability of emergency situations arising.

Progress is still too slow within the city, in the conversion of housing complexes and industrial installations to a centralized heat supply from rayon boiler complexes, even though the economic and ecological benefits are self-evident. These questions have been under review by the Azerbaijan SSR Council of Ministers since 1967. Note has also been taken in this review of the need to eliminate small boiler complexes in the city of Baku. However, the majority of these boilers continue their unprofitable functioning, actively pollute the city's air and use up unnecessarily up to 100-110 million cubic meters of gas. Moreover, the number of such small boiler units is increasing. Because of a lack of coordination between individual economic links, enterprise directors often expend large sums of money upon construction of their own boiler complexes. In new housing complexes, the introduction of a number of rayon boiler heating systems has begun to take place; to this day, however, they have not been placed into operation.

Of substantial influence upon the level of gas consumption is the high proportion of uneconomical gas-burning devices which still remain in operation. There are over 200,000 of these unimproved gas devices now in operation in Baku and in the city's rayons. These contribute to the annual consumption of over 23 million cubic meters of gas. Despite a number of measures taken by the Baku Gas Supply Administration aimed at their replacement, the rate or renovation is not at all comforting. Over recent years only 11,000 of these gas-burning devices have been replaced. At this pace about 35 years will be required to replace all of them.

Already raised in the press is the issue of regulating gas payment rates for enterprises and housing-communal services during the summer and winter periods. Resolution of this issue would have a very positive effect upon strengthening gas consumption discipline. Such discipline is now chronically violated at many enterprises, a situation which finds expression, in particular, in increasing the demand for gas. Such a tendency towards increased demand can be explained in many instances by the lack of scientifically-based specific norms for gas expenditure and to unsatisfactory record keeping of its expenditure. Even though over recent years the number of gas meters at enterprises have been increased significantly, gas expenditure continues to be calculated by the supplier--this arbitrarily and in conflict with the requirements of the Azerbaijan territorial inspectorate of the State Committee for Supervision of the Gas Industry.

A serious problem which manifests itself in providing gas to the populace and to industry is that of the preliminary preparation of that gas. At the present time only 52 percent of the extracted gas passes through the Azerbaijan gas reprocessing plant. The remaining 48 percent is utilized without going through such preparation; this leads to the contamination and premature wearing out of gas pipelines; a productivity decrease; disruption in the regularity of gas delivery to the consumer; and distortion of gas meter readings. In many instances, the gas being supplied to consumers has not been subjected to laboratory analysis and does not meet the requirements of state standards. The main Administration of Gas Supply does not even have its own laboratory for determining the quality of the gas being delivered.

The uninterrupted supply of gas to the populace and to the enterprises of the republic is a problem of major state importance. Final success in its resolution is foreordained upon how we utilize gas today. The directors of enterprises should look upon the question of the rational distribution of gas as one of highest importance and priority.

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MINISTER DISCUSSES PIPELINE TRANSPORTATION

Moscow PLANOVYE KHOZYAYSTVO in Russian No 3, Mar 80 pp 3-11

[Article by B. Shcherbina, minister of construction of oil and gas industry enterprises]

[Text] Development of underground transport systems is the most important trend in development of the country's fuel and energy base. The growth and improvement of the structure of the country's fuel and energy balance depend directly on the extent to which pipelines and compressor and pumping stations are successfully put into operation and what the rates of development of oil and gas fields are.

Pipeline transport is the most efficient and economical. Oil delivery to customers by other types of transport has been reduced significantly due to accelerated development of underground fuel and energy systems in our country. For example, the fraction of liquid fuel has decreased sharply and continues to decrease in railway shipments. Only graded oil will now be shipped by rail.

The length of the fuel arteries has approached 200,000 kilometers. More than two-thirds of the hydrocarbon raw materials is now transported over them. These are the planet's highest capacity systems.

The Ministry of Construction of Oil and Gas Industry Enterprises of the USSR is the world's largest pipeline construction organization, and it has considerable material and technical resources at its disposal. The annual volume of contract work performed by the ministry approaches four billion rubles.

During four years of the 10th Five-Year Plan, the volume of construction and installation work in the sector increased 1.4-fold compared to the corresponding period of the last five-year plan and increased 2.6-fold in Western Siberia. The number of constructed compressor and pumping stations also increased by almost the same amount. Gas refining enterprises are being put into operation annually. The capacity of the enterprises constructed during four years is equal to 15.5 billion m^3. Capacities for

collection and preparation of 138 billion m^3 of natural gas and more than 150 million tons of oil for transport have been created at the fields.

Construction of multinetwork Northwestern Siberia-Ukhta-Torzhok-Minsk-Ivatsevichi-Dolina gas pipeline systems with total length of more than 11,000 kilometers and of the first unit of the Orengoy-Tyumen'-Chelyabinsk run has been completed during the current five-year plan. Construction of the Soyuz gas transport system through the joint efforts of CEMA members received high marks of the party and government.

Giving a speech at the November (1979) Plenary Session of the CPSU Central Committee, L. I. Brezhnev emphasized that gas production, especially in Western Siberia, must be decisively increased, leading rates of development of pipeline transport must be provided and energy programs for the future must be developed.

Pipeline construction has typical features. They include high metal consumption and the estimated cost of erected facilities, multikilometer length of the operational front in different regions of the country and field conditions of conducting construction and installation. The collectives erecting fuel power engineering facilities must overcome various natural and artificial obstacles and difficulties (complex topographic and climatic conditions, frequent redeployment, the remoteness of the facilities under construction from supply bases, the length of communications lines and so on).

The favorable period for completing the main line operations under conditions, for example, of the Tyumen' Arctic, is three times as short as in the middle latitudes of the country, while the expenditures for labor resources are three times greater in these regions. All these features impart special significance to problems of organizing pipeline construction and management of it. The continuous method of constructing the underground line part of pipelines has achieved wide distribution in the sector during the past few years. All major pipelines are now laid by complex process flow diagrams which permitted significant acceleration of the rates of construction of fuel runs.

The flow on the run is the conveyor in which specialized subdivisions interrelated in a unified production process and supplied with the necessary machines and machinery corresponding to the parameters of the facilities under construction leave behind a finished thread of pipeline as they move forward.

Progressive forms of the brigade contract are being introduced successfully in pipeline construction. The specifics of constructing the line part of pipelines (the necessity of technologically interrelated work of large collectives including up to 300-400 persons) required development of the continuous form of the brigade contract, which permits the use of additional reserves for increasing production efficiency and work quality.

Western Siberia occupies a special place in development of the country's fuel engineering. The total increase of oil, gas condensate and natural gas production will be achieved here during the 10th Five-Year Plan.

The fuel balance, production increases, the priority of types of mineral sources and selection of zones of sampling intensity under the conditions established for the 1980s and beyond make it necessary to solve long-term and combined problems at the intersector level which require decisive improvement of production and development of the productive forces in the eastern part of the country and bringing them closer to energy sources.

Such are the problems of using local and so-called balanced gas in the Tyumen' fields for the production of electric power and of the electronic transport of energy to the Urals and the country's center.

Large-scale measures for increasing fuel production in Western Siberia include reduction of the deadlines for putting the Tobolsk and Tomsk chemical combines into operation, development of a large-capacity ammonia and methanol plant, which will facilitate their gas supply on the short major pipeline run, whereas carbon dioxide production at the ammonia plant will permit intensification of oil production. Great opportunities for increasing the rates of fuel engineering development and the efficiency of all social production can be found in similar models of the plan for the coming years. The country's economics has a reliable energy basis for rapid growth with regard to the accelerated rates in the use of nuclear, geothermal, hydraulic and other types of energy and the increase of coal mining (for which pipeline transport is also required). It is natural that under this condition we must construct a large number of systems annually for long-range transport of fuel and primarily of gas.

Most gas fields are located in the area of the Arctic Circle, while the oil fields are loated in the Central Ob' area. Moreover, the main users of this fuel are located in the Urals and in the European USSR. They use almost three-fourths of all the produced hydrocarbon raw material. Thus, not only the volumes of oil and gas transport must be universally expanded, but the range of this transport must be increased. During the Ninth Five-Year Plan, with an increase of All-Union freight volume by almost 60 percent for fuel, the freight volume of fuel increased more than twofold for pipeline transport. Before the end of the 10th Five-Year Plan, 35,000 kilometers of gas pipelines, 15,000 kilometers of oil pipelines and no fewer than 3,500 kilometers of petroleum product pipelines should be put into operation.

A modern underground pipeline of pipes 1,420 mm in diameter and designed for a pressure of 75 atmospheres, extending for 1,000 kilometers, is an energy river which surpasses the capacities of all hydroelectric power plants constructed on the Angara and Yenisey rivers together. But this is also enormous labor, large expenditures and complex technology. Two million tons of metal, reinforced concrete, anchors and so on must be expended, up to 50 million m^3 of excavation work must be carried out and

compressor stations with capacity of more than 750 kW (the current Dneprogas) must be erected to construct 1,000 kilometers of pipeline; the total capital investments will exceed one billion rubles.

And a total of 3,000-4,000 kilometers of steel arteries must be laid to bring Urengoy gas to the country's center. But a single of these "threads" annually is too little.

A clear decision is required--select only the intensive variant of developing pipeline construction. Specific examples indicate the economic advantages which it yields.

The length of the systems linking the Tyumen' fields to the regions of use would have to be brought up to 60,000 kilometers to ensure delivery of, say, 800 billion m^3 of gas to remote customers over a major pipeline with capacity of 35 billion m^3 with the extensive version of development. A similar volume of construction would require enormous expenditures of metal, specifically of pipes. In order not to proceed on this path, there remains only one way--intensification of fuel transport, mainly of natural gas. It is planned to introduce for these purposes in the future such progressive methods of acceleration of transport as increasing the pressure in the gas pipelines to 100-120 atmospheres by using pipes of new design, including multilayer pipes, cooling the gas to -30°C and below, reducing the "spacing" of compressor stations and using electric wiring in them. A combination of all these procedures will permit a 2-3-fold increase of the capacity of a major gas pipeline 1,420 mm in diameter (for commercial gas at the output) compared to those presently under construction.

The 11th Five-Year Plan should lay the bases for conversion to construction of long-range transport of a new engineering class.

Preparation is now underway to construct the first new-generation gas pipeline over which up to 50 billion m^3 of gas annually will be pumped (at working pressure of 100 kgf/cm^2).

The time has come to achieve even more rapid rates of construction of transport and energy facilities and development of fields, for which the construction deadlines should be reduced by a factor of 3-4 compared to the normative deadlines. This is a complex task and the path to solving it lies in further industrialization of construction. The main structures of the line part of pipelines are being manufactured under plant conditions in a centralized manner. The volume of construction work on the run is being reduced to a minimum because of this. Industrialization permits a sharp increase of the reliability and quality of pipeline systems by using pipes with plant insulation, which is much more effective and longer lived than the insulation coatings now used.

The effectiveness of construction industrialization is more significant with high volumes of facilities of the same type. The line part of pipelines corresponds completely to the indicated condition. Complex programs for

scientific and technical development of the sector, compiled at Minneftegazstroy [Ministry of Construction of Oil and Gas Industry Enterprises] provide a number of organizational and technical measures for industrialization of pipeline construction.

The required capacities to manufacture articles for industrialization of construction of the line part of major gas pipelines and the regions of their distribution have been determined in the general layout of industrial enterprises which provide construction by industrial methods.

Manufacture of the necessary pipeline components under plant conditions and use of pipes with plant insulation not only increase the quality of construction, but also open up an area for introduction of new, more economical and reliability design solutions into practice. By improving the technique of constructing the line part of large-diameter pipes by creating a unified complex highly mechanized flow, the builders and installers are oriented toward new, economical design solutions of pipelines constructed by industrial methods. Only in this case can a sharp acceleration in the rate of pipeline construction be achieved with a simultaneous increase of quality and a reduction of cost of the systems.

The modern rate of scientific and technical progress and the desire for the most rapid introduction of new discoveries and developments into practice require more active participation of the sectors in development of a scientific and experimental production base and organization of a machine building subsector. The presence of this base would permit us to complete the stage of design and manufacture of a complex of machines and equipment for laying major pipelines under arctic conditions, permafrost and increased flooding. Approximately 100 new machines, mechanisms, equipment and devices which provide introduction of progressive production processes and monitoring the quality of work performed are being developed annually in the sector.

New equipment is arriving on the runs--large-capacity pipe layers, rotary trench excavators, pipe welding bases with automatic welding processes and checking of weld joints and with complexly mechanized processes of assembly and all auxiliary operations. The Sever-1, Styk and Duga installations have been developed and manufactured for automatic nonrotary welding of pipe sections in a continuous thread and installation for automated checking of the quality of the weld under run conditions.

More than 20,000 kilometers of pipes on the runs have been welded by the electrocontact method. Welding complexes of this technique are also used abroad--by companies which have acquired Soviet licenses. Total automation and the developed technology guarantee faultless quality and very high productivity.

At the same time more improved methods of organizing the use of new equipment are being developed. Large-diameter pipelines are now being

constructed in main mechanized complexes of medium production capacity in which there are 190-240 units of machines, equipment and transport facilities. However, the rates and quality of work in laying pipelines depend not only on the quality of the machines, but also on their unit capacity, productivity, technical level and adaptability to complex conditions. The sectors will require even in the near future machines mounted on tractors with rating of 500-700 horsepower, single-bucket excavators with capacity of 1.2-1.6 m^3 on tractor drive or with rubber-metal caterpillar tracks and pipeline carriers of high traffc ability with load capacity of 50-60 tons. The problem of developing new, powerful machines in the so-called arctic and swamp version must be decided as soon as possible since a further increase of the rates and quality of pipeline construction depends on this.

The output of a large nomenclature of special machines in small series (20-100 units each per year) must be organized. The shortage and absence of a reserve of cleaning, insulating, pipe-bending and other machines lead in some cases to idle times of mechanized complexes in which the budgeted cost of available equipment comprises three million rubles, whereas a cleaning or insulation machine does not cost more than 5,000-10,000 rubles. Minstroymash [Ministry of Construction Machinery], Minneftekhimmash [Ministry of Petroleum and Chemical Machine Building] and Minavtoprom [Ministry of the Automotive Industry] and other machine building ministries should more actively solve the problem of complex mechanization and automation of construction and installation processes.

Construction of many oil and gas facilities, primarily compressor and pumping stations, is also directly related to the rates and prospects for development of fuel engineering. Approximately one-third of capital investments are expended on erection of these and other surface facilities and a good half of all the labor resources of the sector is involved here. In this case the fraction of the cost of surface construction has a tendency to increase.

An exceptionally complex task--double production capacities put into operation within 5-6 years--has been posed to the builders. And this is under conditions when the oil and gas production centers are shifting toward the east and north to ever more difficult natural and climatic zones and to uninhabited regions which have no transport communications.

Methods of solving the indicated problem had to be found by the builders in Western Siberia itself. Their creative search was crowned with success. A method of complete-block construction of surface facilities, which is based on transfer of the maximum construction and installation work from the construction sites to specialized stationary enterprises, was developed during 1964-1967. The characteristics of this method include the fact that improvement touches all parts of the facilities, from the production to the life-support part, i.e., the problem is solved in a complex manner. Therefore, when developing the scientific principles of the given method, the complex (systems) approach to increasing the effectiveness of

construction of surface facilities by optimization of the unified "industrial production--construction production--operation of the constructed facility" function system was used for the first time.

Block devices (blocks, block-containers and block-boxes), which are totally manufactured and tested at plants, and which are then delivered to the construction sites for the entire facility as a whole, were developed as a result of the new approach. Because of this, the volume of remaining construction and installation work was sharply reduced and the rates of erecting each surface facility were accelerated.

The special Production Association Sibkomplektmontazh was created which constructs facilities in the complete-block version and which skillfully utilizes the advantages of organic fusion of industrial and construction production.

The creative search is continuing. The production base is being developed and strengthened. Investigations have been conducted to standardize design and configuration solutions of single block devices, general plans (honeycomb configuration), to bring production pipelines to platforms and to communications corridors, to install piling foundations and so on. This improvement on the basis of the complex-block method made it possible to reduce labor expenditures by a factor of 2-2.5 at the site, the mass of construction materials by a factor of 3-4, the area of general plans by a factor of 2.5-3 and to accelerate construction of facilities by 25-35 percent.

The total national economic effect from introduction of the block-complete method at facilities of the oil and gas industry exceeded 500 million rubles during 1973-1978 alone.

Further development and an increase of the efficiency of the block-complete method require improvement of the entire invested process of developing new capacities for oil and gas production and transport by transferring functions on design, making up the set, construction and adjustment of equipment to Minneftegazstroy, which will provide favorable conditions for conversion to the new form in organization of construction of surface facilities--to construction "under lock and key."

The block-complete method provides rapid introduction of large oil and gas production capacities provided high rates of growth of the volumes of construction and installation work are maintained and provided there is significant expansion of the scales of construction with universal saving of labor resources.

By reducing the expenditures of live labor at construction sites, a conversion to superblocks must be provided, the capacities of individual facilities must be increased and new designs of block-boxes which make up complete and standardized buildings must be more daringly introduced. One should purposefully proceed along the path of improving the design solutions,

extensive introduction of the brigade contract and specialization of general contracting organizations in preparation of construction sites and engineering development of them. Purposeful concentration of resources at starting facilities should be regarded as universal conversion to automated control systems, to making up a set of block facilities through Gossnab of the USSR with transfer functions for sale of them to the Sibkomplektmontazh Association as further improvement of the structure and organization of transport-completing subdivisions.

Preceding development of the complex-block method occurs on an equipment base developed long before the appearance of construction-production blocks. It is natural that the forms and version of units, the disposition of locations for connection of communications and attachment assemblies and the location of repair zones do not always correspond to the new requirements. This nonconformity is aggravated with development of block construction.

This means that units designed for disposition in blocks are required as it is necessary to increase their unit capacity in combination with miniaturization. There is no doubt of the effectiveness of these solutions. But they were not realized during the initial stage and little is being done to accomplish them during the present stage.

The ingrained agency distribution of functions on design of facilities among corresponding institutes of the customer sectors, i.e., Minneftaprom and Mingazprom, also interferes with best implementation of progressive solutions. For example, this leads to the fact that the estimated cost of their planned facilities is not always linked to regional and future problems. Let us say, it was planned to locate them on an area of approximately five hectares in 1972-1973 in traditional plans of oil pumping stations (NPS) with NM-10,000-210 pumps, while the entire station was located on one hectare in the plans of SibNIPIgazstroy [Siberian Scientific Research, Planning and Design Institute of Gas Industry Construction Enterprises] with honeycomb configuration of blocks. An entire construction organization capable of assimilating approximately two million rubles of capital investments was required to construct NPS within normative deadlines with traditional solutions. A complex brigade, much smaller in numbers, now copes with this problem.

Realization of the functions of a customer under modern conditions requires serious systematic investigations to determine the rational conformity of the level of comfort, the new technical units required for operation and the properties of the structures since one and the other are being continuously renovated. Conducting these complex investigations in construction and machine building requires a special method and a modern scientific base. In practice it is only a large regional-sector construction system. An economic mechanism which would provide operational and complete use of the latest, most effective advances of science and technology in plans is required.

The procedure of making up sets of equipment also remains traditional. Even facilities of the same type are made up in an uncentralized manner, by different subdivisions of sector-customers. This makes it difficult to concentrate resources on starting facilities and to synchronize deliveries with manufacture of blocks.

The complete-block method, being developed and experiencing everything new and progressive, is gradually changing to an intersector, state technical policy. Further development and improvement of it must now be provided, without losing time, during the second stage of complex development of Western Siberia.

Solution of the ever more painful problems of managing the investment process was found in the decree of the CPSU Central Committee and the USSR Council of Ministers "On improving planning and intensification of the effect of the economic mechanism to increase production efficiency and work quality." The problem of eliminating those elements in the economic mechanism which reduce the effectiveness of the investment process was posed in this decree. This can also be said about the problem of price stability for construction products. Until recently the customers were not "linked" by the estimated cost of facilities. The situation is now being fundamentally changed: the role of the estimate is increasing, the estimated cost of facilities will be reviewed in exceptional cases and the customers will be obligated to stay within the limits of capital investments.

An important aspect in the decree is the authorization to utilize above-plan profits formed by putting production capacities into operation ahead of schedule for material incentives of participants of the investment process. In some cases acceleration of putting facilities into operation requires additional expenditures, but no kind of bonus was paid for this until quite recently. A contradictory situation was established--the builders lost profits exactly when the efficiency of their activity was increased. Elimination of this bottleneck opens the way to improved organization of construction and installation work on pipeline construction and other facilities of fuel engineering.

The structure of the sector is being improved. All line administrations and trusts have become cost-accounting and complex types and have achieved project by project specialization. Each of them performs the entire production complex of work on pipeline construction.

The specifics of the sector required specialization of work at the trust level and adoption of program-purposeful orientation to put construction projects into operation. Not everything here is without debate. Time permits improvement of this system. But the first results were very hopeful. The rate of work has increased appreciably. Most administrations have fulfilled the plans of construction installation work. The growth rate of construction operations comprised 7.4 percent throughout the sector in 1979, while a growth rate of construction operations completed through

their own efforts comprised 7.9 percent. A considerably greater number of facilities were put into operation. And such large construction projects as the second unit of the Urengoy-Chelyabinsk Gas Pipeline, the new oil region on Buzachi Peninsula in the Kazakh SSR, the gas refining plants with capacity of 11 billion m^3 annually and the large capacities in the Siberian fields were completed ahead of schedule. The plan on an increase of labor productivity was overfulfilled.

The structure of underwater engineering work, setting up repair matters, organization of work on major product pipelines and so on require improvement. With regard to this, the general scheme for managing the sector, an automated system, methods of optimum planning and loading of resources and programs for computer solution of a number of economic-mathematical problems are being worked out. Our sector institutes are working on these problems in cooperation with other scientific research organizations.

Problems of managing the sector in light of the tasks indicated in the mentioned decree of the CPSU Central Committee and the USSR Council of Ministers acquire special significance. Corresponding normative documents on planning, financing and providing credit to construction organizations under conditions of calculating the commercial construction product, on planning labor productivity and the wage fund in construction and installation organizations by net production (normative) are being worked out at Minneftegazstroy; a system of progressive technical and economic norms and norms on types of work and expenditures of labor, raw material, materials and fuel and energy resources, the use of production capacities and specific capital investments and so on is being created.

Solution of the problem of improving the organization of pipeline construction and management of it requires a systems approach, complex investigation based on modern scientific methods and development of optimization criteria and methods in a number of directions, including organizational and technological reliability, improvement of organizational structures at all levels, problems of operational management, planning the organization of construction, development of the necessary finishing work, optimum disposition of bases and resources and the sociological aspects of improving the organization of pipeline construction.

The relationship of the volumes and length of laying pipelines is being investigated in the general annual and future planning system. This is being done to develop methods of calculation, organizational schemes and distribution of resources which ensure fulfillment of the sector operating plan. Preparation of the sector plan of work organization for the entire program is determined by its importance in this general topic in order to provide optimum distribution of the volumes of work among construction and installation organizations, effective concentration of resources at pipeline facilities and development of efficient departments to fulfill the plans of subsequent years.

The institutes of the ministry are now working out a continuous planning system with pipeline construction on the sector scale. Its base should be a system of long-term flows, development of which has now begun.

A telegram of greetings from General Secretary of the CPSU Central Committee, Chairman of the Presidium of the USSR Supreme Soviet L. I. Brezhnev with regard to significant overfulfillment of the 1979 tasks and four years of the five-year plan arrived on the eve of the final year of the 10th Five-Year Plan, addressed to the collectives of the enterprises and organizations of the gas industry and construction and installation organizations engaged in erection of gas production, refining and transport facilities. In answer to this high mark, the builders of the major pipelines assured the party and government that they will apply maximum efforts and will achieve completion of the 1980 tasks and of the five-year plan as a whole ahead of schedule. And these tasks are very intensive and responsible.

More than 10,000 kilometers of pipelines, several tens of compressor and pumping stations, large capacities for liquid fuel storage and more than 6,000 kilometers of cable and radio relay communications lines and a number of other production capacities will be put into operation in 1980. The most important construction projects include construction of the Urengoy-Nadym-Punga-Ukhta-Gryazovets gas pipeline with pipes 1,420 mm in diameter and development of this system to the Moscow Ring and Torzhok. The total length of the pipeline will comprise 3,300 kilometers. Among the large new construction projects are two installations for complex gas preparation with total capacity of 30 billion m^3 at the Urengoy field.

The construction program for the gas industry will be expanded considerably. A number of new fields must be put into operation. It is planned to implement the increasing program of social-cultural and service construction and development of the infrastructure in regions of new settlement.

The scales, time and rates necessary for our economy dictate the search for and the urgency of introducing essentially new organizations, techniques and management structures. A further increase of the industrial level of construction is the key to successful fulfillment of the tasks on putting facilities of the oil and gas industry into operation and on development of a reliable base for implementing the long-term program for development of domestic power engineering.

6521
CSO: 1822

CURRENT STATE OF UKRAINIAN COAL INDUSTRY AND PLANS FOR 1980

Kiev UGOL' UKRAINY in Russian No 1, Jan 80 pp 1-6

[Article by Ukrainian SSR Minister of the Coal Industry N. K. Grin'ko: "Ukrainian Coal Industry in the Concluding Year of the Five-Year Plan"]

[Text] "Key problems are in the center of attention of the party: development of a fuel and raw material base, power engineering, metallurgy, machine construction and the chemical industry, significant and immediate improvement in the situation in transportation, in capital construction, transformation of agriculture into a highly developed sector of the economy, and increase in the production of foodstuffs and goods of popular consumption. Extensive work has unfolded to perfect planning and control of the economy and the entire economic mechanism. The party requires from all party, state and public organizations, economic organs further strengthening of the discipline and order, meticulous, daily organizational and educational work, initiative and responsible attitude towards the business, and unfailing fulfillment of the adopted decisions."

(From the decree of the CPSU Central Committee on the 110th anniversary of the birthday of Vladimir Il'ich Lenin).

The new, 1980 year, the concluding year of the 10th Five-Year Plan, the year of the 110th anniversary of the birth of V. I. Lenin, of elections to the supreme soviets of the union and autonomous republics, as well as to the local soviets of people's deputies, was greeted by the miners of the republic, like all the Soviet people, in an atmosphere of political and labor progress, and ever-increasing activity for the successful implementation of the decisions of the 25th CPSU Congress and the 25th Congress of the Ukrainian Communist Party. The miners with deep interest and satisfaction received the decree of the November (1979) Plenum of the CPSU Central Committee, the speech of L. I. Brezhnev and the decision of the second session of the USSR Supreme Soviet and [illegible] full of resolution to make a worthy contribution to the further development of the country's economy.

Implementation of the measures for acceleration of technical progress directed towards improvement in the effectiveness and quality of production is continuing at the mines of the republic. The enterprises are equipped with new and highly productive equipment, work is underway to perfect mining and the complex mechanization of coal extraction. In recent years mechanized complexes have been created and introduced for extraction of coal on gently sloping and steep beds, tunneling combines, new conveyors for transporting coal and rock, progressive types of timbering, technological plans for preparation and finishing off coal beds, and perfected methods of ventilation and degasification.

During the 4 years of the five-year plan the level of coal extraction by mechanized complexes rose by 13.3%, combine-making of drifts by 7.2%, mechanization of the manual labor from 31.6% to 34.2%. Work to mechanize the most labor-intensive processes has been practically completed: loading of coal in the working faces, mining mass during the tunneling of the preparatory drifts, conversion of stationary and technological complexes of the surface into automatic and remote control. Major measures are being implemented for improvement in the safety of underground operations.

A considerable volume of capital construction has been fulfilled. Annually (1976-1979) over 1 billion R of capital investments were assimilated in the branch. Coal extraction with output of 11.4 million T was introduced, including by means of introducing new mines--9.1 million T and by means of reconstruction--2.3 million T. The mines imeni Stakhanov, No 10 "Velikonostovskaya," imeni Geroi kosmosa, "Zapadno-Donbasskaya No 16/17 were put into operation, and the large mines "Krasnolimanskaya," "Krasnyy partizan," "Novo-Butovskaya," "Yasinovskaya-Glubokaya," and others were reconstructed. In 1980 the first phases of the following new mines will be introduced: "Zhdanovskaya-Kapital'naya," "Sukhodol'skaya-Vostochnaya," and "Nagol'chanskaya No 1/2." Reconstruction will continue of the active enterprises. For the reproduction of the line of working faces 216 new layers were built in 1976-1979, which made it possible to put 296 longwalls into operation with the line of faces about 54 km.

New facilities for reprocessing the run-of-mine coal were introduced as a result of the construction of large enrichment plants--"Voroshilovgradskaya" with rated output 3 million T per year and "Chervonogradskaya" with output 9.6 million T, reconstruction of the active--"Yanovskaya" with an increase in output of 1.2 million T and "Krasnolimanskaya"--1.1 million T. In 1980 the enrichment plant of the mine "Dolzhanskaya-Kapital'naya" will be put into operation.

A socioeconomic program is being implemented for improvement of the working and living conditions of the miners. They have been given additional privileges, the one-time compensation for length of service has been increased, and moral and material stimuli are widely used for victors of the socialist competition. Since the beginning of the five-year plan over 40,500 apartments

11 schools, 9 dispensaries and 4 hospitals have been built. Construction of houses by the economic method, according to individual credits is expanding. However, all of this does not mean, as noted at the November (1979) Plenum of the CPSU Central Committee and the second session of the USSR Supreme Soviet that one can be completely satisfied with the work results. In certain sections of the national economy the strain is preserved. The assignments for 1980 for a number of positions are below those planned for the five-year plan. The main reason for these shortcomings and tight places is that in the area of further improvement of the efficiency of production and quality of work advances have not been successfully made as planned.

There is no need to prove that to a decisive degree the successful fulfillment of the plans for economic and social development of the country and the republic for 1980, and the assignments of the entire five-year plan depend on how the miners work. One should stress that in coal extraction the Ukraine occupies the leading place in the USSR, being the main fuel base of its European sector. It yields one-third of the coal in the country and almost half of the most valuable coking brands. This is why our main task is to successfully fulfill the planned and additional assignments and to accumulate the planned supplies of fuel for the consumers.

Today, as First Secretary of the Ukrainian Communist Party Central Committee V. V. Shcherbitskiy stressed in his speech at the presentation to the city of Donetsk of the Order of Lenin, the most important task of the Ministry of the Coal Industry of the republic, leaders and collectives of the production associations and mines consists of the fact that in the near future the level is increased of engineering work, at each mine a quality front of working faces is created, the use of equipment is improved, and everywhere high degree of organization, discipline and the strictest observance of the established pattern of work of the mines and sections are guaranteed.

From here it is understandable what a great responsibility lies on the apparatus of the ministry, associations, mines, and all the workers of the coal industry to guarantee the smooth operation and further development of the branch. At the same time serious shortcomings occur: as yet the level of coal extraction has not been successfully raised, nor the strain in the supply of the national economy with fuel reduced. The work of the branch, besides certain objective difficulties, is especially affected by technical and engineering miscalculations, and in a number of cases also the irresponsible attitude to fulfillment of the plans and assignments, and adopted decisions. In December 1978 the board of the Ukrainian SSR Ministry of the Coal Industry adopted the main directions whose implementation afforded real paths for the most rapid elimination of shortcomings and stabilization in the operation of the branch. In particular, stress was placed on the advance preparation of the working front, more effective use of the mechanized complexes, on improvement in the state of mining, completion of the staff of workers, and freeing of other tight places, i.e., on those directions that required and require constant attention on the part of the leaders and engineering-technical workers for increase in coal extraction.

The method of the program for work for 1980 indicated that many leaders of the associations and mines, having placed them at the base of their engineering and organizational activity, guarantee the fulfillment of the extraction plans for each working day; individual, previously lagging collectives entered the ranks of the leading. Measures were adopted and the debt compensated for by the mines and mine administrations "Novogrodovskoye" (director I. S. Kuznetsov), imeni 21st CPSU Congress (Yu. M. Golub), "Rodinskaya" (V. D. Martovitskiy), "Kochegarka" (Yu. V. Kaminskiy), imeni Kapustin (V. I. Prorochenko), imeni Geroi kosmosa (A. F. Nagorskiy), et al.

However, due to serious omissions in the supervision of the enterprises, in the organization of labor and production, due to the weakening of the executive discipline and demand many mines continue to lag behind the commissioned business. Last year they underproduced millions of tons of coal, and reduced to nothing the efforts of the leading collectives. The following mines worked poorly and during the year increased their debt for coal extractions: imeni Zasyad'ko (former director V. V. Sereda), "Tsentral'naya" (director V. I. Radchenko), "Novodruzheskaya" (V. N. Shabratskiy), "Almaznoye" (V. V. Ukrainets) and others. The directors need to be engaged in an improvement in the organization of labor, strengthening of the production and labor discipline, imposition of order in mining, timely preparation of the line of working faces, improvement in the use of mining equipment according to the experience of the leading workers, at the same time specifically, and business-like.

Serious shortcomings are permitted in capital construction. The mine construction organizations have not reached the rates required for the standardized periods of mine construction, as a result of which their putting into operation often is interrupted. There are many omissions in the organization of work of the tunneling and construction brigades, and the leading experience of the brigade contract is poorly utilized. And the most important is that despite the enormous resources invested in the branch there is still no proper yield.

In 1979 for the 37 new and reconstructed mines introduced in the Ninth and 10th Five-Year Plans, over 2 million T of coal were underproduced for the rated output. The level of mastery of the outputs by such large mines as imeni Skochinskiy, "Progress," "Oktyabr'skiy rudnik" comprises 80-85%, while the mines No 10 "Velikomostovskaya," imeni Geroi kosmosa, "Samarskaya," and imeni Dimitrov--40-70%. The planning institutes Dongiproshakht (M. I. Vasilov), Dneprogiproshakht (G. S. Pin'kovskiy), Yuzhgiproshakht (V. S. Ushkalov) and Ukrniiproyekt (A. M. Sharkov) have permitted miscalculations for these mines in the selection of loads for the working faces, and means of mechanization of coal extraction. The plans have included mining equipment not assimilated by the industry, and the specific mining-geological conditions and work experience of analogous active mines have not been considered.

All these and other shortcomings result in a decrease in the technical and economic indices, and the labor productivity at the active and construction of the new mines.

In viewing the year 1980 as the base on which the 11th Five-Year Plan will be built, as the year for preparation for the 26th CPSU Congress the workers of the branch are obliged to approach the evaluation of what has been done and the resolution of the set tasks with self-criticism and with all responsibility. The ministry board, in light of the decisions of the November (1979) Plenum of the CPSU Central Committee and the December (1979) Plenum of the Ukrainian Communist Party Central Committee, the second session of the USSR Supreme Soviet and the 11th session of the Ukrainian SSR Supreme Soviet developed and approved a program of work for 1980, defined the specific volumes, periods of fulfillment, responsible individuals, their regular accounting, and intensified the measures for control over the actual fulfillment of the business.

The role and the responsibility of the personnel is increasing--from the ministry to the mine, especially the mine foreman, heads of the sections, shifts, and engineering-technical workers on whom the precise organization of labor and production depends a great deal in each shift, in each section, in each brigade. The lagging mines are reinforced by the more experienced leaders. Potentialities are examined for increasing the volumes of making preliminary drifts and preparing a new front of stoping work, obtaining an increase in extraction for the most promising mines by means of eliminating tight places in the technological links and preparing highly productive longwalls. It has been planned to increase the volumes of making stripping and preparatory drifts by 43.5 km and to reach 1975 km. This will permit an increase in the number of active working faces by 55 and bring them to 1760. For the creation of a reserve it is planned to prepare at each mine no less than one longwall operating in one shift. The number of such longwalls will be greater by almost 1.5 times as compared to 1979 and will be brought to 240.

The extraction level of the working faces operating on the columnar systems and blockless technology will be increased respectively from 66 to 67% and from 48 to 50%, which will make it possible to implement on broad scales the transition to progressive technological schemes. The conversion of the longwalls to more effective operating patterns with isolation of a special repair shift is being stimulated.

For purposes of improving the technological condition and throughput of the underground transportation that at many mines restrains the extraction it is planned to bring the level of its conveyerization on inclined drifts to 89%, and on horizontal--to 21%. There will be a reduction in the low-output haulage of coal with perpetual cables and with terminal cables, and at 20 mines--the number of faces with two and more stages in the transportation.

The condition of road management is being improved, heavy type rails are being laid on reinforced concrete cross ties, and the switchovers are being automated. Freight and passenger suspension and ground cable roads are being introduced, and the conversion of mines to the package-container delivery of freight and materials from the manufacturing plants to the work sites has been accelerated. The introduction of the leading wall shooting of a difficult-to-cave-in roof (in 40 longwalls) and chemical anchoring of the unstable (in 90 longwalls) creates conditions for organization of the normal operation of the working faces. Measures are being taken to master standardized loads by all the comprehensively-mechanized longwalls. At the Antratsit, Bryanka, Gorlovka and Rutchenkovskiy ore repair plants shops have been organized for the repair of the hydraulic apparatus of mechanized timbering; a mechanized line has been put into operation for repair of sections at the Sverdlovsk ore repair plant. Production of chutes made of higher quality steel has been organized. Advanced technology of repair of the mining equipment is being introduced.

In 1980 work will be continued to create safe working conditions, improve the culture and daily life of the miners. The board of the Ukrainian SSR Ministry of the Coal Industry, presidium of the Ukrainian republic committee for the trade union of coal industry workers and Ukrainian SSR Gosgortekhnadzor [State Committee of the Council of Ministers for Supervision of Industrial Safety and for Mining Inspection] by a special decree approved measures for a radical improvement in the working conditions and increase in work safety, and for a drastic reduction in accidents and production injuries. At five mines reconstruction of ventilation will be completed, 36 new main ventilators will be put into operation, and a number of ventilators will be replaced with more productive ones. Eight additional mines are switching to degasification, at 20 mines prevention and localization of explosions of coal dust with the use of water are being introduced, and at 18--systems of centralized control over methane and automatic gas protection on the basis of special apparatus.

In order to create a stable base for productive labor its organization is being perfected, reserves are being sought for increasing the efficiency of production, and the most efficient operating patterns of the mines have been approved. Thus, the main directions for the further development of the coal industry in the republic are:

--most rapid elimination of shortcomings, increase in the level of technical supervision of the mines and structures, universal widespread of the leading experience of the organizational and political-educational work;

--perfection of mining, elimination of tight places in the technological links of production, supply of the mines with sufficient and good quality front of working faces, creation of the necessary production conditions for complete utilization of the productive equipment and further spread of the experience of the leading brigades who have achieved high work indices in the working faces and for tunneling of mine drifts;

--acceleration of the rates of technical progress based on further technical re-equipping of the mines and enrichment plants;

--perfection in the organization of production and labor, strengthening of the labor and production discipline, imposition of order in the operating pattern of the mines in order to guarantee fulfillment of the planned assignments for extraction of coal on the working days; not to permit operation of the mines on the days set aside for repair; to consider the fulfillment on the working days of the planned assignments for coal extraction to be the most important index in evaluating the activity of the enterprises and the production associations;

--improvement in industrial hygiene and work safety thanks to an increase in the level of technical development of production, introduction of more advanced and safe systems of working, perfection in the ventilation systems, broad use of the means of gas protection, degasification of the coal beds and air conditioning, training of the workers in safe working methods; improvement in the residential and cultural-general conditions of the miners;

--increase in the outputs for extraction and processing the coal by means of acceleration in the construction of new, reconstruction and technical re-equipping of the active mines and enrichment plants, as well as by means of mastery of the rated outputs of the new and reconstructed enterprises in the standard periods;

--radical improvement in the situation in the mine construction, renewal of active facilities. Half of all the capital investments for the branch are directed towards technical re-equipping and reconstruction of the enterprises. It is necessary to more actively conduct a course towards the reduction in periods of construction of the mines as a consequence of the concentration of capital investments, material and human resources on the starting construction sites, perfection of technology of mine construction. It is impossible to permit the large mines to be constructed in 12-15 years due to the unsatisfactory organization of construction; it is necessary to evaluate the work of the construction organizations not according to the volume of assimilated capital investments, but according to the introduction of the planned facilities and plants;

--strengthening of the production base of the mine construction organizations, broad use of the industrial methods of construction, the leading experience, and the brigade contract.

The development of the coal industry, the attainment of high indices are possible on the condition of further perfection in the economic mechanism of the branch, and increase in the efficiency and quality of work. Determination of really possible volumes of coal extraction and other planned indices the certificates, in particular, for each enterprise and association acquires especially great importance. These certificates must contain objective data on the availability and use of facilities, on the organizational-technical

level of production, as well as other technical and economic indices necessary for compilation of the five-year and annual plans. The standard statute on the certificate has been approved; in 1980 the certificates must be developed by all the associations and enterprises, thoroughly studied and adopted by the ministry. At the enterprises, construction sites and organizations work should be intensified to save fuel and electricity, to conduct a mass struggle for the effective use of the fuel and energy resources.

Great tasks face the scientific research, planning-design institutes and organizations, and plants of coal machine construction who need to create more quickly together with the production engineers and to widely introduce new resources for comprehensive mechanization of coal extraction from thin beds of the gently sloping and steep inclination, combines for making preparatory drifts, mechanization and automation of the main and auxiliary processes in order to eliminate to the maximum the heavy manual labor. From the mechanical engineers we await complete supply of the mines with series manufactured equipment and spare parts of high quality.

The miners also count on the all-possible help of other related branches, on the railroad workers, workers of the material and technical supply; the solution to the tasks facing the coal industry that is one of the basic and key branches of the national economy depends to a great extent on them.

The country is ready to worthily meet the 110th anniversary of the birth of V. I. Lenin, who to the great pride of the miners is an honorary miner. He was awarded this title in the first years of Soviet power. Here is the document that even today cannot be read without deep agitation: "The miners of Gorlovka have decided to name state mine No 5 after Comrade Lenin and to ask their beloved leader Il'ich to accept the title of Honorary Miner. His earnings are allocated for cultural work." Since then this mine in Gorlovka has carried the name of Lenin, and Vladimir Il'ich is the First Honorary Miner. Every year the brithday of Il'ich is marked by a Leninist labor watch.

The greeting of General Secretary of the CPSU Central Committee, Chairman of the Presidium of the USSR Supreme Soviet, Comrade L. I. Brezhnev to the workers, engineering-technical workers, party, trade union and komsomol organizations, and all workers in the mine "Mayskaya" of the association Rostovugol', and the congratulation of the Ukrainian Communist Party Central Committee and the Ukrainian SSR Council of Ministers to the collectives of the mines "Kuybyshevskaya" of the association Donetskugol', "Stepnaya" of the association Pavlogradugol', "Kommunist" of the association Shakhterskantra tsit, and the 50th Anniversary of Soviet Ukraine mine of the association Donbassantratsit induced great enthusiasm and new creative energy. Early fulfillment of the plan for 4 years of the five-year plan has been reported by the collectives of the associations Donetskugol', Ordzhonikidzeugol', Shakhterskantratsit, over 103 mines, 414 sections and 816 extracting and tunneling briganes, 4,500 facemen, of which 400 have already completed their

personal five-year plan. Among them are P. Ye. Lisnyak (Artem mine), V. G. Grinev (Izotov mine), A. Ye. Domukhovskiy (mine administration "Aleksandrovskoye"), and so forth.

For early fulfillment of the planned assignments for the 4 years of the five-year plan for coal extraction and the attained advances in increasing the efficiency of production by the Ukase of the Presidium of the Ukrainian SSR Supreme Soviet a large group of distinguished workers, mining foremen and heads of sections in the leading mines No 9 "Velikomostovskaya," "Odesskaya," imeni gazeta "Sotsialisticheskiy Donbass," and the mine administration "Kiyevskoye" was awarded honorary certificates and certificates of the Presidium of the Ukrainian SSR Supreme Soviet, while a number of leaders and workers were awarded the title of honored miner of the Ukrainian SSR for long and faultless work in the coal industry.

Socialist competition was further developed among the brigades for daily extraction from one mechanized working face of 1000 T of coal and more. In the republic 111 brigades are working with such a load, whereas only several years ago they numbered units. These brigades, comprising 7% of the total number of extraction brigades, in 1979 produced 43.3 million T of coal, or 31.6% of the working extraction fromthe beds with angle of incidence to 35°. Labor productivity in these brigades is 3 times higher than in the usual faces.

The greatest daily average extraction in the republic mines was reached by the brigades of the miners in the working face led by A. Ya. Kolesnikov (mine "Molodogvardeyskaya"), N. N. Skrypnik (mine administration imeni Frunze), A. D. Polishchuk (mine "Trudovskaya"), G. I. Motsak (mine administration imeni Kosmonavty), V. G. Murzenko (mine "Krasnyy partizan"), G. Ye. Abramov (mine administration "Butovskoye"), and others. These brigades have brought the stable load on the longwall to 1500-2000 T of coal per day. Among the leading brigade workers the initiative has become widespread "not by number but by skill," to attain labor productivity of a worker of 500-1000 T per month. Fourteen brigades are already operating with such productivity. The best results in increasing the monthly labor productivity were attained by the collectives led by P. A. Kaminskiy (mine "Butovka-Donetskaya")--1157.8 tons, V. I. Ignat'yev ("Krasnolimanskaya," imeni 50th anniversary of the Great October Socialist Revolution)--651 T, V. A. Buynistruk (No 3 "Velikomostovskaya")--630.7 T.

The daily complex brigade consisting of three extraction links and one repair has been acknowledged as the most efficient in the comprehensively mechanized faces. Jointly with the engineering and technical services of the mines in the brigades of leading workers schedules have been worked out for organization of labor, strict fulfillment of which makes it possible to combine to the maximum the processes and operations of the production cycle. A lot of attention is being given to the preventive maintenance of the mining equipment, which makes it possible to reduce to a minimum the loss of working time.

At the republic mines the initiative of 10 leading brigades who have developed a movement for increase in the load in the longwalls on thin beds approved by the Ukrainian Communist Party Central Committee has been widely supported. Following the example of the innovators, 170 brigades here are extracting 500 T and more each of coal per day.

It needs to be especially stressed that great and important work is being done by the collectives of the mine builders and tunnelers. It is they who are building the modern mines and introducing new facilities. Having mastered the leading methods for organization of labor, the collectives of 222 tunneling brigades have achieved high rates of tunneling. In 1979 they made more than 500 km of drifts with average rate of 195 m per month. Competition of the high-speed specialists-tunnelers is led by the brigades headed by V. G. Vendilovich (Abakumov mine), D. G. Khomich ("Chervona zirka"), N. M. Naumov (mine administration "Znamya kommunizma"), V. A. Kovalenko (imeni 19th CPSU Congress), V. M. Vernigorov (mine "Pavlogradskaya"), V. P. Sokolov (imeni Chelyuskintsy), and others.

Among the mine builders in the lead are the tunneling brigades of A. N. Nosov (mine construction administration No 6 of the trust Donetskshakhtostroy), N. I. Korotayev (mine tunneling administration No 6 of the trust Voroshilovgradshakhtoprokhodka), V. K. Voloshchenko (mine construction administration No 2 of the trust Donetskshakhtostroy), V. I. Bubnova (mine construction administration No 3 of the kombinat Dneproshakhtostroy) and many others who systematically achieve high indices in work.

One of the best methods for spreading the leading experience has become the initiative of the brigades of the miners of the working face of V. N. Pikhterev (Abakumov mine) and A. Ya. Kolesnikov who have appealed: "Let each leading brigade bring one lagging collective to their level." At the mines chief assistance is rendered by 585 leading brigades. As a result of the active collective tutorship lagging has been overcome and 209 previously lagging brigades have coped with the plan.

In 1980 the leading brigades have taken high socialist commitments, having decided to work at accelerated rates, in the Leninist manner. The collectives of the mines imeni 60th Anniversary of the Great October Socialist Revolution of the association Shakhterskantratsit and "Chervona zirka " of the association Torezantratsit, the extracting and mine-tunneling brigades headed by S. F. Bilyk, V. G. Vendilovich, B. I. Kobtsev, A. Ye. Nikolayev, V. D. Timchenko, V. D. Tikhorskiy, D. G. Khomich, and V. A. Chuyev were the initiators of the competition for the early fulfillment of the plan by the 110th anniversary of the birth of V. I. Lenin. The miners of the association Krasnodonugol' appealed for "50 accelerated weeks for the 110th anniversary of the birth of V. I. Lenin."

Many collectives have reviewed the previously adopted commitments for coal extraction and have decided by means of a daily fulfillment and overfulfillment of the planned assignments to guarantee smooth operation. The

oncoming plans and socialist commitments for early completion of the 10th Five-Year Plan have been adopted by collectives of 69 mines. These and other initiatives have been examined by the board of the Ukrainian SSR Ministry of the Coal Industry and the Ukrainian republic committee of trade unions, and measures have been planned for guaranteeing the efficient assistance for highly productive labor of all the participants in the competition. It is necessary to widely unfold socialist competition, mutual help and exchange of experience with all the miners of the Soviet Union. The coal basins of Donbass, Kuzbass, Donetskaya, Voroshilovgradskaya and Rostovskaya oblasts have been competing already more than half a century. This competition should be given scope and publicity. In each labor collective, production cell of the branch it is necessary to set up a situation of high exactions and a creative attitude towards the business.

The year 1980 has come into its own. There is no doubt that under the supervision of the party organizations the mining collectives will do everything in order to mark the 110th anniversary of the birth of V. I. Lenin and the 26th CPSU Congress with high achievements in work and to guarantee the reliable supply of the national economy with coal.

The Ukrainian miners will give all strength, knowledge and energy to the struggle for successful completion of the assignments of the 10th Five-Year Plan, decisions of the November (1979) Plenum of the CPSU Central Committee, and December (1979) Plenum of the Ukrainian Communist Party Central Committee. With their selfless labor they will raise even higher the revolutionary banner of Leninism. When our Soviet country meets the anniversary of V. I. Lenin and the 26th CPSU Congress the associations, mines, open pits, enrichment plants and each collective will adopt increased commitments and will apply all their strength to fulfill them with honor.

I take this opportunity, in the name of the board of the Ministry of the Coal Industry and the Ukrainian republic committee of the trade union to warmly wish the miners a Happy 1980 New Year, and wish them and their families good health, happiness and new successes in labor for the good of our great motherland.

9035
CSO: 1822

NEW ERGV-630.9/0.5 ROTARY EXCAVATOR FOR COAL MINING

Kiev-UGOL' UKRAINY in Russian No 1, Jan 80 inside back cover and back cover

[Article: "ERGV-630-9/0.5 Rotary Excavator"]

[Text] The ERGV-630-9/0.5 rotary excavator of small linear parameters with high digging force is designed for extracting stone pit and hydrogenous coals, as well as other stone minerals with specific resistance K to digging up to 23 kg-f/cm^2 (without blast-hole drilling).

The excavator has been adapted for year-round operation in the temperature interval from -40 to +35°C. The machine has passed state tests on one of the open pits in the Buryatskaya ASSR and in 1979 was accepted for series production. A machine of such class has been developed for the first time and does not have analogs among the foreign models.

The economic effect is 349,000 R per year for 1 machine.

Specifications of ERGV-630-9/0.5 Rotary Excavator

Theoretical output in loose mass, m^3/h:	
with K_F=10 kg-f/cm^2	1250
K_F=14 kg-f/cm^2	1000
K_F=18 kg-f/cm^2	800
K_F=23 kg-f/cm^2	630
Greatest output, T/h	1500
Diameter of rotor	3.2
Number of scoops	8
Number of cutting elements	8
Holding capacity of scoop (with regard for 50% volume of of subscoop chamber), l	140
Height of step, m	9.5
Depth of scooping, m	16.3
Radius of unloading, m	16.6
Height of unloading, m:	
greatest	5.25
least	3.40

Width of conveyer belt, mm	1000
Rate of belt conveyers, m/s:	
reception	4.0
unloading	4.5
Rate of advance of machine, m/h	355
Permissible incline, deg:	
during movement	7
during digging	3
Average specific pressure on ground, kg-f/cm^2	1.3
Supplied voltage, V	6000
Rated power of high-voltage electrical equipment, kw	880
Weight of excavator, T	280

9035
CSO: 1822

OIL WELL FIRE AT SAMGORSKOYE DEPOSIT

Moscow SOVETSKAYA KUL'TURA in Russian No 13, 12 Feb 80 p 8

[Article by Ye.Popol, Tbilisi: "Seventeen Days of Courage"]

[Text] On that day there were no indications of trouble at drilling rig No 66 in the Samgorskoye deposit, not far from Tbilisi. I. Tabukashvili's work crew was on duty. They were expecting shows of oil from a depth of about 3,000 meters. However, the unexpected happened. As the drilling tool was being lowered at 0300 hours, oil from a depth of 2,376 meters pushed the solution out ahead of it and shot into the air, forming a "gusher." The alarm was given and a specialized detachment for dealing with gas and oil gushers soon arrived from Tbilisi. Other detachments came from Baku and then from Groznyy. All possible measures were taken to control the spontaneous blowout.

Suddenly the oil blazed up. A fiery plume soared upward into the sky. In 7 minutes the steel derrick, which had been surrounded by the flaming torch, crashed to the ground. Fire broke out on a section of the Kakhetinskoye highway that had been covered with oil.

The emergency was becoming one of menacing dimensions. In order to deal with it, Gruzneft' [Goergian Oil Field Administration] formed a special staff. Colonel E. Giorgadze, the chief of the republic's Fire Protection Administration, was named to lead the efforts to extinguish the fire. The most advanced equipment was gathered at the site of the fire. Reinforcements were brought in from Rustavi, Poti, Sukhumi and other cities in the republic.

Before putting the fire out, however, it was necessary to clear all the ruined and baked equipment away from the mouth of the well in order to "smooth out" the flare. About 400,000 tons of metal had to be pulled out of the fire. The man in charge of

this operation was an experienced specialist from Baku: T. Voskanov, a unit commander from the Southern Industrial Region for the Prevention and Elimination of Gas and Oil Gushers.

Under a screen of jets of water, people in protective helmets and canvas suits rushed into the fire and hooked steel cables onto the twisted metal. Tractors then pulled the ruined pieces out of the fire. Sometimes the cable broke, and then everything had to be done again.

It was unbearably hot. The high temperature caused the paint to crack on a fire engine parked 100 meters away. Even though he had been wearing protective clothing when he was working close to the fire, Major Nodara Tsiklauri found that a plastic pen in the breast pocket of his field shirt had melted. Nevertheless, the people continued to fight the fire.

The clearing of the well mouth took 8 days. Finally the torch was balanced and again it rose to a height of 60 meters. Then, before attacking the fire it was necessary to prepare the well for the installation of shutoff fittings. Pouring water on each other, the firefighters carefully approached the well mouth where the fiery plume was raging. Tight jets of water beat on the flare, "pushing" the flame upward in order to give the oil workers a chance to cut the deformed metal base of the drilling rig off with an autogenous welder. This operation took several days.

The oil industry is the youngest branch of industry in Georgia. Naturally, the republic's firefighters did not yet have enough experience in combatting fires at oil industry enterprises. To assist them, a group of specialists led by the deputy chief of the republic's Fire Protection Administration, Colonel A. Sorokin, arrived from Azerbaydzhan. They all trained together for the massive attack on the fire. At the appointed time, dozens of mounted hoses assaulted the gusher with an unprecendented flood of water. The fire shrank, was compressed as if by a vise, and finally went out. The well was then reliably capped.

The duel with the elemental force lasted 17 days. In the dispatches and reports there appeared the names of many people who had distinguished themselves by their heroism and selflessness: oil workers, workers from the specialized detachments for dealing with gas and oil gushers.

By ukase from the Presidium of the Georgian SSR Supreme Soviet, the medal "For Bravery at the Fire" has been awarded to those who performed services of particular merit.

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